
TENNESSEE

Standards Review and Assessment Grade 7



HOUGHTON MIFFLIN HARCOURT

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Printed in the U.S.A.

ISBN 978-0-547-47859-3

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To the Student

These practice activities are correlated to the state performance indicators for grade 7 and are designed to prepare you to take Tennessee's grade 7 assessment test. The practice tests reflect the type of wording likely to be encountered on the actual test.

Mathematics State Performance Indicators

Grade 7

Standard 1 — Mathematical Processes

State Performance Indicators:

- SPI 0706.1.1** Use proportional reasoning to solve mixture/concentration problems.
- SPI 0706.1.2** Generalize a variety of patterns to a symbolic rule from tables, graphs, or words.
- SPI 0706.1.3** Recognize whether information given in a table, graph, or formula suggests a directly proportional, linear, inversely proportional, or other nonlinear relationship.
- SPI 0706.1.4** Use scales to read maps.

Standard 2 — Number & Operations

State Performance Indicators:

- SPI 0706.2.1** Simplify numerical expressions involving rational numbers.
- SPI 0706.2.2** Compare rational numbers using appropriate inequality symbols.
- SPI 0706.2.3** Use rational numbers and roots of perfect squares/cubes to solve contextual problems.
- SPI 0706.2.4** Determine the approximate location of square/cube roots on a number line.
- SPI 0706.2.5** Solve contextual problems that involve operations with integers.
- SPI 0706.2.6** Express the ratio between two quantities as a percent, and a percent as a ratio or fraction.
- SPI 0706.2.7** Use ratios and proportions to solve problems.

Standard 3 — Algebra

State Performance Indicators:

- SPI 0706.3.1** Evaluate algebraic expressions involving rational values for coefficients and/or variables.
- SPI 0706.3.2** Determine whether a relation (represented in various ways) is a function.
- SPI 0706.3.3** Given a table of inputs x and outputs $f(x)$, identify the function rule and continue the pattern.
- SPI 0706.3.4** Interpret the slope of a line as a unit rate given the graph of a proportional relationship.
- SPI 0706.3.5** Represent proportional relationships with equations, tables and graphs.
- SPI 0706.3.6** Solve linear equations with rational coefficients symbolically or graphically.
- SPI 0706.3.7** Translate between verbal and symbolic representations of real-world phenomena involving linear equations.
- SPI 0706.3.8** Solve contextual problems involving two-step linear equations.
- SPI 0706.3.9** Solve linear inequalities in one variable with rational coefficients symbolically or graphically.

Mathematics State Performance Indicators (continued)

Standard 4 — Geometry & Measurement

State Performance Indicators:

- SPI 0706.4.1** Solve contextual problems involving similar triangles.
- SPI 0706.4.2** Use SSS, SAS, and AA to determine if two triangles are similar.
- SPI 0706.4.3** Apply scale factor to solve problems involving area and volume.

Standard 5 — Data Analysis, Statistics, & Probability

State Performance Indicators:

- SPI 0706.5.1** Interpret and employ various graphs and charts to represent data.
- SPI 0706.5.2** Select suitable graph types (such as bar graphs, histograms, line graphs, circle graphs, box-and-whisker plots, and stem-and-leaf plots) and use them to create accurate representations of given data.
- SPI 0706.5.3** Calculate and interpret the mean, median, upper-quartile, lower-quartile, and interquartile range of a set of data.
- SPI 0706.5.4** Use theoretical probability to make predictions.

Pre Test

- 1** Mr. Jones wants the table tennis team to win 64% of its games. What fraction of its games is this?

A $\frac{9}{25}$

B $\frac{32}{50}$

C $\frac{2}{3}$

D $\frac{3}{5}$

- 2** Which inequality is true?

F $\frac{2}{15} < 0.1$

G $\frac{7}{15} < 0.22$

H $\frac{11}{15} < 0.75$

J $\frac{14}{15} < 0.9$

- 3** Which best describes the relationship between the input values and the output values?

Input	Output
2	4
3	9
5	25
7	49

- A** inversely proportional
B directly proportional
C exponential
D linear

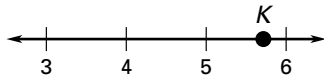
- 4** The table below shows the cost y of x granola bars purchased at a local market. Which equation relates x and y ? Use the equation to find the cost of 12 granola bars.

x	1	2	3	4	5
y	\$0.75	\$1.50	\$2.25	\$3	\$3.75

- F** $y = 0.75x$; \$9
G $y = 75x$; \$900
H $y = 0.75 + 0.75x$; \$3.75
J $y = 12x$; \$5

Pre Test (continued)

- 5** Point K represents the approximate location of which number?



- A** $\sqrt{25}$
B $\sqrt{30}$
C $\sqrt{36}$
D $\sqrt{48}$

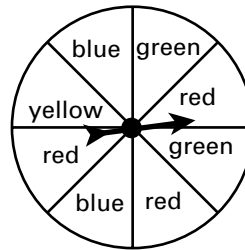
- 6** Matteo is saving to buy a new computer that costs \$2,000. He has already saved \$450. Each month he saves another \$300. Which equation can be used to find m , the number of months it will take before Matteo can buy a new computer?

- F** $300m + 450 = 2,000$
G $300 + 450 + m = 2,000$
H $300 + 450m = 2,000$
J $300m - 450 = 2,000$

- 7** If 5 gallons of water weigh 42 pounds, how much would 2 gallons of water weigh?

- A** 12.8 lb
B 16.8 lb
C 20 lb
D 105 lb

- 8** This spinner is divided into 8 sections of equal size.



If the arrow is spun once, what is the probability that it will stop on a section labeled with blue or green?

- F** $\frac{0}{2}$
G $\frac{1}{4}$
H $\frac{1}{2}$
J $\frac{8}{4}$

Pre Test (continued)

- 9** Tanya babysits on the weekends. She puts 35% of what she earns in a savings account. She uses 20% for school supplies, and the rest for lunch money. What is the ratio of the amount saved to the amount used for lunch money?

A 9:7
B 7:9
C 7:4
D 4:9

- 10** A football team has 10 players whose average weight is 140 pounds. The eleventh player weighs 162 pounds. What is the mean weight of the players on this team?

F 141 lb
G 142 lb
H 148 lb
J Cannot be determined with information provided

- 11** Weston made the table below to show the heights and radii of three cylinders. Which equation shows the relationship between the height and the radius?

Radius (r)	Height (h)
3	7
4	8
5	9

A $h = 2 \times r$
B $r = 2 \times h$
C $h = r + 4$
D $r = h + 4$

- 12** Which shows a relation that is a function?

F list of animals with 4 legs
G coaches and number of wins
H Nashville high temperatures in August
J list of neighbors and number of pets

Pre Test (continued)

- 13** On the planet of Mercury, temperatures can have a range of 600°C in one day. Suppose today's low temperature is -129°C and the range is 600°C . Which number best represents today's high temperature?

A 600
B 129
C 471
D 729

- 14** As part of a probability experiment, Juan rolled two fair number cubes, one after the other. Each cube had its faces numbered 1 through 6. What is the probability that the first cube landed on an even number and the second cube landed on an odd number?

F $\frac{1}{18}$
G $\frac{1}{4}$
H $\frac{1}{2}$
J $\frac{3}{4}$

- 15** If $b = \frac{1}{2}$ and $c = 6$, then $\frac{bc - 1}{2} =$

A 0
B 0.5
C 1
D 2.5

- 16** 31.2% of all active military personnel are female. Which number is equivalent to 31.2%?

F 3.12
G $\frac{312}{1,000}$
H 3,120.0
J $\frac{312}{100}$

Pre Test (continued)

- 17** George uses 8 ounces of pizza sauce to make 2 pizzas. At this rate, how many ounces does he need to make 8 pizzas?

A 10 oz
B 16 oz
C 32 oz
D 64 oz

- 18** Hannah and her friends spent \$113 to rent a sailboat. There was a \$15 deposit plus a charge of \$28 per hour. The equation below can be used to find h , the number of hours they used the sailboat.

$$113 = 28h + 15$$

For how many hours did Hannah and her friends use the sailboat?

F 3.5 hr
G 4 hr
H 4.6 hr
J 5.6 hr

- 19** If $n = 6$ and $p = 0.5$, then $n(5 - p) =$

A -0.5
B 27
C 29.5
D 33

- 20** The table below shows values of powers of 3.

Powers of 3	Value
3^0	1
3^1	3
3^2	9
3^3	27
3^4	81
3^5	243
3^6	729
3^7	2187
3^8	6561
3^9	19,683
3^{10}	59,049
3^{11}	177,147

What is the ones digit in 3^{15} ?

F 1
G 3
H 7
J 9

Pre Test (continued)

21 Which is equivalent to $\frac{2}{7} \times 0.5 \div \frac{3}{5}$?

A $\frac{3}{35}$

B $\frac{5}{21}$

C $\frac{3}{7}$

D $\frac{3}{4}$

22 Dan delivers newspapers. He earns \$10 each week plus \$2 for each customer on his route. Which equation can he use to find c , the number of customers he needs to earn exactly \$20 each week?

F $10c - 2 = 20$

G $10c + 2 = 20$

H $2c + 10 = 20$

J $2c - 10 = 20$

23 The seventh grade girls' basketball team at Ross Middle School won their last game. The following table lists the points each player scored.

Player	Points
Tina	9
Julie	6
Michelle	8
Sarah	5
Jenny	12
Alma	19
Candice	11

Which measure of data is represented by 9 points?

A mean

B mode

C median

D range

Pre Test (continued)

- 24** Ann has \$10 to pay for balloons for her brother's birthday party. Each balloon costs \$2. Which inequality could be used to find the maximum number of balloons that Ann can afford to buy?

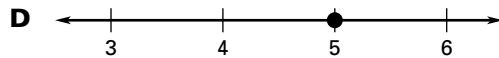
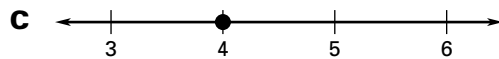
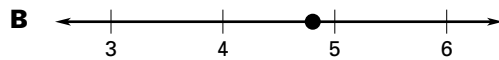
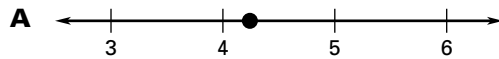
F $2 - b \leq 10$

G $\frac{1}{2}b \leq 10$

H $2b \leq 10$

J $2b \geq 10$

- 25** Which number line best represents the approximate location of $\sqrt{18}$?



- 26** This set of ordered pairs represents a function.

$$\{(1, 3), (2, 9), (3, 27), (4, 81)\}$$

Which ordered pair can be included in the set so that it still represents a function?

F $(0, 0)$

G $(0, 3)$

H $(3, 0)$

J $(3, 3)$

Pre Test (continued)

- 27** Select the symbols to complete this inequality.

$$\underline{\hspace{1cm}} 0.384 \underline{\hspace{1cm}} 1\frac{3}{8}$$

- A** $>, >$
- B** $<, <$
- C** $>, <$
- D** $<, >$

- 28** What is the solution of the equation?

$$\boxed{-5a + 10 = 20}$$

- F** -6
- G** -2
- H** 2
- J** 6

- 29** Cathy is solving this equation.

$$\boxed{2y + 8 = 40}$$

Which solution does she get?

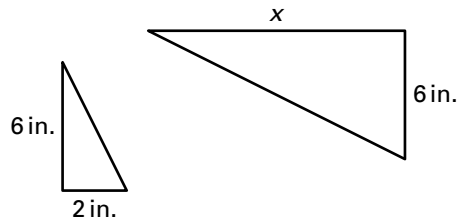
- A** $y = 8$
- B** $y = 16$
- C** $y = 24$
- D** $y = 32$

- 30** The square gift box has a volume of 42.875 cubic inches. How tall is the box?

- F** 3.5 in.
- G** 10.5 in.
- H** 14.29 cu in.
- J** 128.625 cu in.

Pre Test (continued)

- 31** The two similar triangles shown are patterns used to make quilts.



What is the value of x , the length of the larger triangle?

- A** 2 in.
B 4 in.
C 10 in.
D 18 in.

- 32** Giovanni has to photocopy 130 pages. Which two places have the same price?

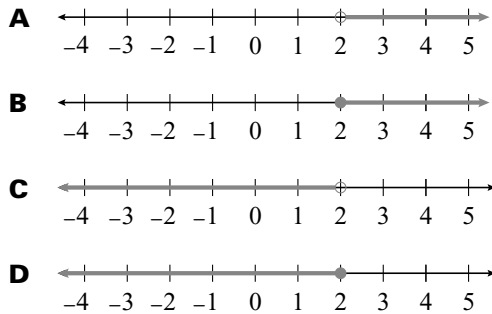
Store	Pricing
Ron's Photocopying	4¢ a copy
Photocopy World	3¢ a copy, minimum purchase of \$4.00
Fast Copy	5¢ a copy, 20% discount for orders of more than 100 pages
1-2-3 Copies!	2.5¢ a copy plus service fee of \$2.00

- F** Ron's Photocopying and Photocopy World
G Ron's Photocopying and Fast Copy
H Photocopy World and 1-2-3 Copies!
J Fast Copy and 1-2-3 Copies!

Pre Test (continued)

- 33** Which of the following graphs represents the solution to this inequality?

$$x + 7 > 9$$



- 34** A survey of 75 students found that 45 preferred hip-hop to rock music. How many out of 300 would you expect to prefer hip-hop to rock?

F 45
G 120
H 180
J 275

- 35** Which fraction is equivalent to $\left(\frac{2}{3}\right)^3$?

A $\frac{8}{27}$
B $\frac{4}{9}$
C $\frac{2}{3}$
D $\frac{8}{9}$

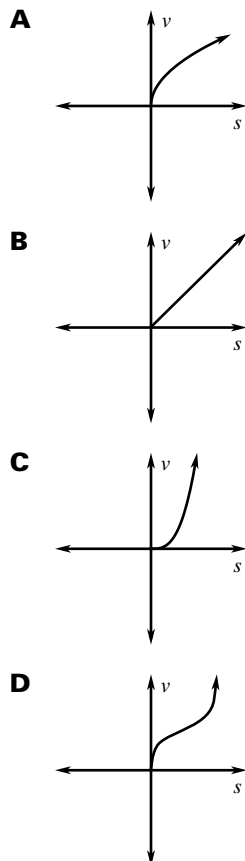
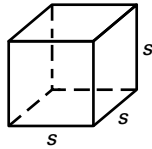
- 36** Which list shows the mode and range of the data set below?

3, 14, 5, 6, 9, 1, 0, 4, 4, 3, 7

F mode: 3; range: 13
G mode: 4; range: 14
H mode: 3 and 4; range: 13
J mode: 3 and 4; range: 14

Pre Test (continued)

- 37** Which graph best represents the relationship between the side length of the cube below and its volume?



- 38** Two squares are similar. The area of the smaller square is 6 square inches. The area of the larger square is 54 square inches. What is the ratio of the side length of the smaller square to the side length of the larger square?

F $\frac{1}{18}$

G $\frac{1}{12}$

H $\frac{1}{9}$

J $\frac{1}{3}$

- 39** Which equation has a solution of 4?

A $1 - 6x = 25$

B $6x + 13 = 31$

C $9 + 6x = 15$

D $6x - 19 = 5$

Pre Test (continued)

- 40** All values of p make this inequality true, except which one?

$$1.8 > p \leq 0.75$$

F $\frac{7}{8}$

G $\frac{5}{7}$

H $\frac{9}{7}$

J $\frac{9}{8}$

- 41** Max can ride his bicycle 5 miles in a half hour. At this rate, how far can he ride in 3 hours?

A 15 mi

B 30 mi

C 45 mi

D 60 mi

- 42** Look at the function table.

x	-1	0	1	2
y	3	0	-3	-6

Which of the following equations represents the relationship between x and y shown in the table?

F $y = 3x$

G $y = -3x$

H $y = 3x - 3$

J $y = x + 3$

- 43** What is the solution to this inequality?

$$5x < 20$$

A $x < 4$

B $x > 4$

C $x < 25$

D $x > 25$

Pre Test (continued)

- 44** Mary is conducting a science experiment on plant growth. She grew four different plants and varied the amount of sunlight each received. Which would be an appropriate way for Mary to display the data?

F line graph
G stem-and-leaf plot
H circle graph
J box-and-whisker plot

- 45** Which of the following is the solution to this inequality?

$$-6x \geq 12$$

A $x \geq 2$
B $x \geq -2$
C $x \leq 2$
D $x \leq -2$

- 46** Mariah bought several pencils that cost 30¢ each. She also bought a notebook for \$2.50. Altogether she spent \$7. The equation below can be used to find p , the number of pencils Mariah bought.

$$0.30p + 2.50 = 7$$

How many pencils did Mariah buy?

F 4
G 5
H 15
J 31

Pre Test (continued)

- 47** The table shows the relationship between the number of pencils in a box and the price of the box.

Pencils	Price
2	\$1.50
3	\$2.25
4	\$3.00
5	\$3.75

How much would a box with 9 pencils cost?

- A** \$6.00
- B** \$6.75
- C** \$7.50
- D** \$13.50

- 48** Two rectangular solids are similar. The volume of the smaller solid is 140 cubic inches. The volume of the larger solid is 1,120 cubic inches. What is the ratio of the side length of the smaller rectangular solid to the side length of the larger rectangular solid?

- F** $\frac{1}{16}$
- G** $\frac{1}{8}$
- H** $\frac{1}{4}$
- J** $\frac{1}{2}$

- 49** Look at the function table.

x	y
-1	-0.25
0	0
1	0.25
2	
3	0.75

What is the value of y when $x = 2$?

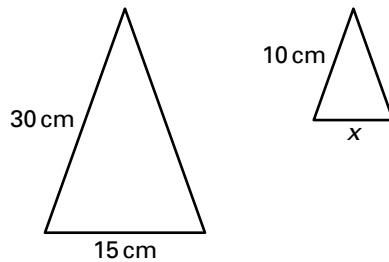
- A** -0.50
- B** -0.25
- C** 0.50
- D** 1.00

- 50** A triangle has lengths of 14 centimeters and 25 centimeters with an included angle of 53° . Which list shows the side lengths and angle measure of a similar triangle?

- F** 7 cm, 50 cm, 37°
- G** 7 cm, 50 cm, 53°
- H** 42 cm, 75 cm, 37°
- J** 42 cm, 75 cm, 53°

Pre Test (continued)

- 51** The two similar triangles shown are patterns used to create a stained glass window.



What is the value of x , the base of the smaller triangle?

- A** 5 cm
- B** 15 cm
- C** 20 cm
- D** 45 cm

- 52** The data in the table below shows the relationship between the approximate volume of a snack container in cubic inches, x , and its height in inches, y .

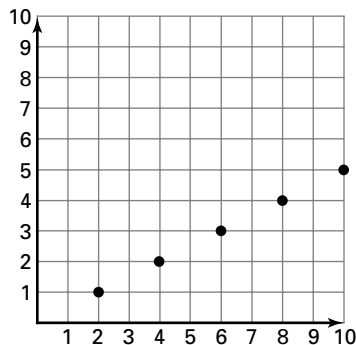
Volume in cubic inches, x	Height in inches, y
10	2
20	4
30	6
40	8

Which best describes the relationship between the volume values, x , and the height values, y ?

- F** inversely proportional
- G** directly proportional
- H** exponential
- J** nonlinear

Pre Test (continued)

- 53** Which of the following relationships is best represented by the data in the graph?

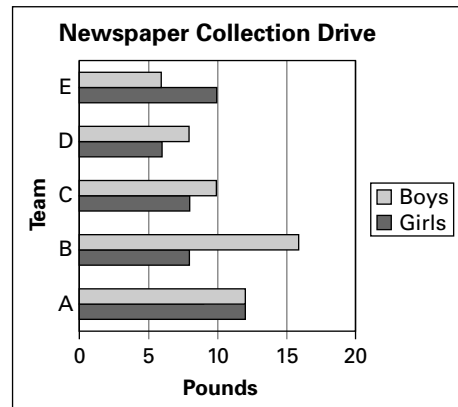


- A** conversion of quarters to dollars
B conversion of days to weeks
C conversion of ounces to cups
D conversion of cups to pints

- 54** A triangle has side lengths of 30 inches, 66 inches and 80 inches. Which list shows the side lengths of a similar triangle?

- F** 6 in., 12 in., 16 in.
G 15 in., 33 in., 40 in.
H 40 in., 56 in., 90 in.
J 60 in., 120 in., 160 in.

- 55** Teams A, B, C, D, and E participated in a newspaper collection drive.



Which is the best estimate of how many more pounds of newspapers the boys collected?

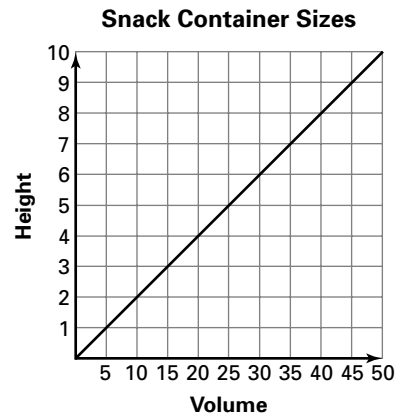
- A** 4 lb
B 10 lb
C 20 lb
D 50 lb

Pre Test (continued)

- 56** A geologist looks for fossil samples. At a location 15 feet below sea level, she removes the first sample. Next she climbs up 23 feet to remove a second fossil. How many feet above sea level is the second sample?

F -38 ft
G -8 ft
H 8 ft
J 38 ft

- 57** The graph shows the relationship between the volume of a snack container and its height.



What does the slope of the line represent?

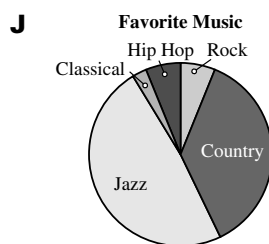
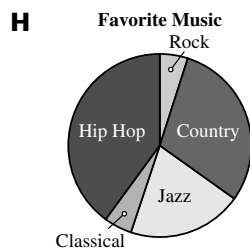
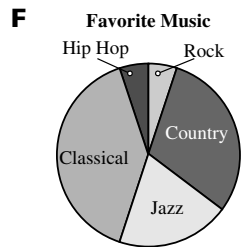
- A** the total number of snack containers
B the maximum height of the containers
C the relationship between the volume and the height of the containers
D the relationship between the height and the volume of the container

Pre Test (continued)

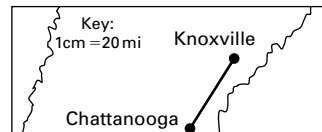
- 58** Seventh graders were asked about their favorite type of music. The table shows the results of the survey.

Type of Music	Percent Favoring
Rock	30
Country	40
Jazz	20
Classical	5
Hip-Hop	5

Which circle graph shows the information on the table?



- 59** On the map, the distance from Knoxville to Chattanooga is 5 centimeters. About what is the actual distance in miles?



- A** 4 mi
B 25 mi
C 100 mi
D 200 mi

- 60** Which rule generates the sequence

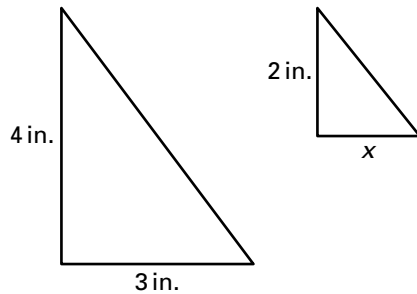
4, 7, 10, 13, 16, ...

where n represents the position of a term in the sequence?

- F** $3n + 1$
G $4n$
H $7n - 3$
J $n + 3$

Pre Test (continued)

- 61** The two similar triangles shown are patterns used to make game pieces.



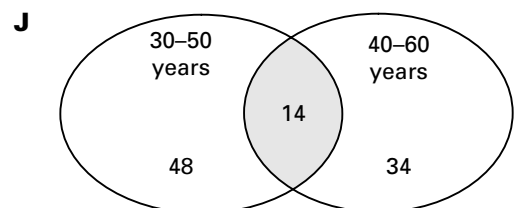
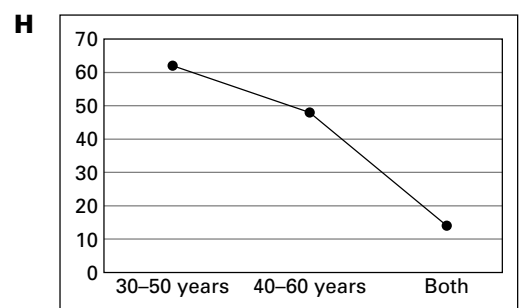
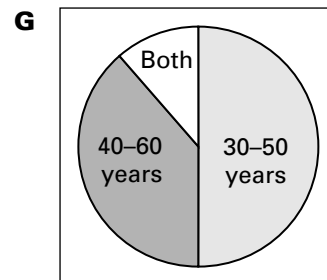
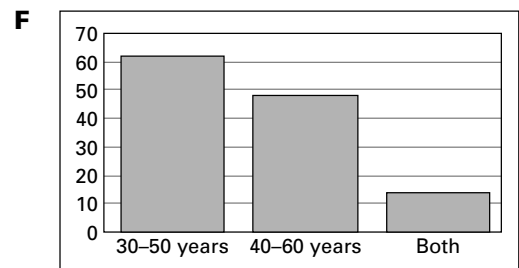
What is the value of x , the width of the smaller triangle?

- A** 1 in.
B 1.5 in.
C 3.5 in.
D 5 in.

- 62** A local sports arena started 2 adult hockey leagues. The table below shows the number of participants in each league.

League	Players
30–50 years	62
40–60 years	48
Both	14

Which graph best represents this data?



GO ON

Pre Test (continued)

- 63** Julianna has a square tablecloth with an area of $6\frac{1}{4}$ ft². She wants to put a lace trim around the edges. How much lace does she need?

A $2\frac{1}{2}$ ft
B $6\frac{1}{4}$ ft
C $8\frac{3}{4}$ ft
D 10 ft

- 64** Simplify $7 \div 14 \times \frac{1}{14}$

F $\frac{1}{28}$
G $\frac{1}{7}$
H $\frac{1}{2}$
J 7

SPI 0706.1.1

Use proportional reasoning to solve mixture/concentration problems.

- | | |
|---|---|
| <p>1 A 12-pound bag of flour costs \$3.60. How much will a 98-pound bag of flour cost?</p> <p>A \$7.20</p> <p>B \$21</p> <p>C \$29.40</p> <p>D \$36</p>
<p>2 It will take Holly 6 days to clean her garage if she cleans for 4 hours a day. How many days will it take if she cleans for 3 hours a day?</p> <p>F 1.5</p> <p>G 2</p> <p>H 8</p> <p>J 24</p> | <p>3 A migrating bird can fly 120 miles in 10 hours. At this rate, how many miles will the bird fly in 8 hours?</p> <p>A 96 mi</p> <p>B 110 mi</p> <p>C 112 mi</p> <p>D 118 mi</p> |
|---|---|

SPI 0706.1.1 (continued)

- 4** A model rocket travels at an average speed of 275 feet per second. About how many seconds does it take the rocket to travel 1,700 feet?

F 0.16 sec
G 6.2 sec
H 1,430 sec
J 10,571 sec

- 5** A carpenter estimates it will take 54 person-hours to build an addition on a house. How many hours will it take if 3 people work together?

A 11 h
B 18 h
C 51 h
D 162 h

- 6** The chart below shows the typing speeds of four people. Who types the fastest?

Person	Typing speed
Amy	55 words in 1.2 minutes
Max	108 words in 100 seconds
Ali	3 words in 2 seconds
Lee	10 words in 0.1 minutes

F Amy
G Max
H Ali
J Lee

SPI 0706.1.2

Generalize a variety of patterns to a symbolic rule from tables, graphs, or words.

- 1** Which expression always represents an even number?

A $n + 1$
B $2n$
C $2n + 1$
D $3n$

- 2** Which sequence is generated by the rule $7 - 3n$ where n represents the position of a term in the sequence?

F 10, 13, 16, 19, 22, ...
G 4, 7, 10, 13, 16, ...
H 4, 1, -2, -5, -8, ...
J 4, 8, 12, 16, 20, ...

- 3** The table below shows values for x and corresponding values for y .

x	4	8	12	16
y	1	2	3	4

Which equation represents the relationship between x and y ?

A $y = \frac{1}{4}x$
B $y = x - 3$
C $y = 4x$
D $y = x - 12$

- 4** Which rule generates the sequence

2, 7, 12, 17, 22, ...

where n represents the position of a term in the sequence?

F $2n + 5$
G $7n - 5$
H $10n - 8$
J $5n - 3$

SPI 0706.1.2 (continued)

- 5** The expression shown below describes a pattern of numbers.

$$n(n + 2) - 1$$

If n represents a number's position in the sequence, what pattern of numbers does the expression describe?

- A** 2, 7, 14, 23, 34, ...
- B** 0, 4, 10, 18, 28, ...
- C** 2, 4, 8, 14, 22, ...
- D** 0, 6, 14, 24, 36, ...

- 6** The table below shows values for x and corresponding values for y .

x	2	3	4
y	18	12	9

Which equation represents the relationship between x and y ?

- F** $y = x + 5$
- G** $y = 3x + 3$
- H** $y = 9x$
- J** $xy = 36$

- 7** Which equation describes the four ordered pairs $(-1, -5)$, $(0, -3)$, $(1, -1)$, and $(2, 1)$?

- A** $y = 2x - 3$
- B** $y = 3x - 2$
- C** $y = -4x - 5$
- D** $y = 3x + 4$

- 8** Max bought a rectangular wooden box that has a perimeter of 20 inches. Two of the sides are 4 inches long. Which expression describes the perimeter of the box?

- F** $4x$
- G** $8 + 2x$
- H** $12 + x + x$
- J** $20x$

SPI 0706.1.2 (continued)

- 9** Sarah is training for the track team. Which expression represents the number of minutes Sarah will run on the n th day?

Day	1	2	3	4	n
Minutes spent running	14	17	20	23	?

- A** $11 + 3n$
B $14n$
C $14 + 3n$
D $26n$
- 10** If a is a positive number, b is a positive number, and c is a negative number, which expression is always negative?
- F** $a + c$
G ab
H $\frac{a}{b}$
J abc

- 11** If x is an integer, which statement must be true about $2x + 1$?

- A** $2x + 1$ is a prime number.
B $2x + 1$ is a composite number.
C $2x + 1$ is even.
D $2x + 1$ is odd.

- 12** The table shows how the number of students attending a play determines the total cost of their tickets. Which equation describes this relationship?

x	y
10	250
15	375
22	550
31	775

- F** $x = 25y$
G $y = 25x$
H $y = x + 240$
J $y = \frac{25}{x}$

SPI 0706.1.2 (continued)

- 13** Patrick needs to save \$315 to buy a new stereo. He is saving \$15 a week. Which equation will give the number of weeks w it will take Patrick to save enough money to buy a new stereo?

A $315 \div w = 15$
B $15 \times 7w = 315$
C $315 \times 15 = w$
D $w \times 52 = 315$

- 14** A farmer borrowed \$8,568 from the bank to build a stable on a ranch. The monthly payment on the loan is \$238. Which equation will give the number of months m it will take to pay off the loan?

F $8,568 \div m = 365$
G $8,568 \div 238 = m$
H $8,568 \times 238 = m$
J $m \times 365 = 8,568$

- 15** Which equation best describes the relationship between x and y shown in the table below?

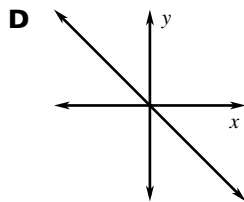
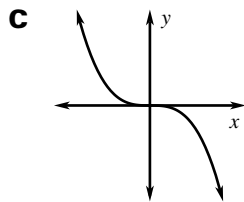
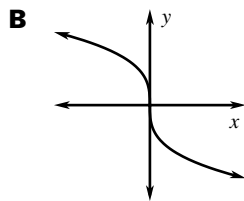
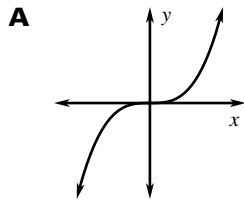
x	0	1	2	3
y	1	2	5	10

A $y = x + 1$
B $y = 2x$
C $y = 2x + 1$
D $y = x^2 + 1$

SPI 0706.1.3

Recognize whether information given in a table, graph, or formula suggests a directly proportional, linear, inversely proportional, or other nonlinear relationship.

- 1** Which could be the graph of $y = -x^3$?



- 2** Which relationship shows direct variation?

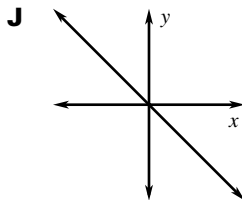
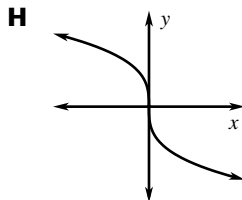
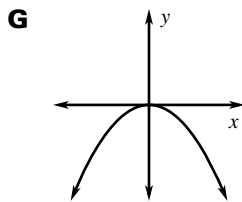
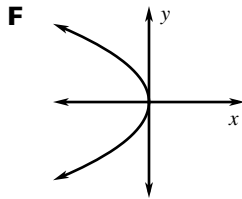
- F** the side length and area of a square
- G** the circumference and area of a circle
- H** the side length and volume of a cube
- J** the radius and diameter of a circle

- 3** Which type of correlation best describes the relationship between the time of day and the temperature inside a refrigerator?

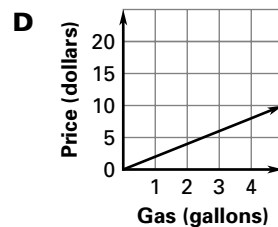
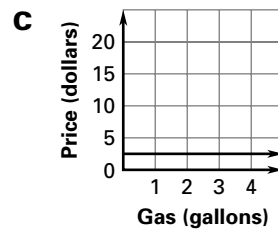
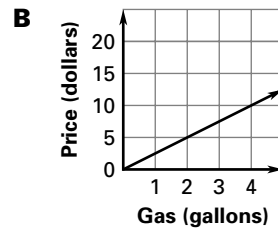
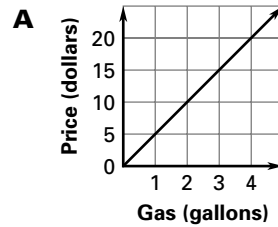
- A** relatively no correlation
- B** negative correlation
- C** positive correlation
- D** constant correlation

SPI 0706.1.3 (continued)

- 4** Which could be the graph of $y = -x^2$?

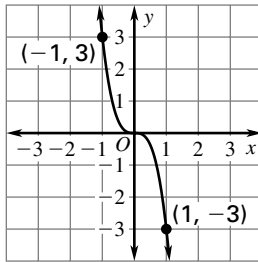


- 5** The price of gas is \$2.50 per gallon. Which graph shows this relationship?



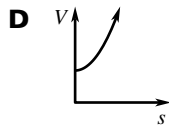
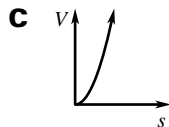
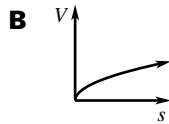
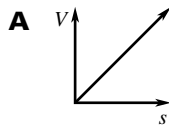
SPI 0706.1.3 (continued)

- 6**
- What is the equation of the graph below?



- F** $y = -3x^2$
G $y = -3x^3$
H $y = 3x^2$
J $y = 3x^3$

- 7**
- Which graph best represents the relationship between the side length
- s
- of the base of a cube and its volume
- V
- ?



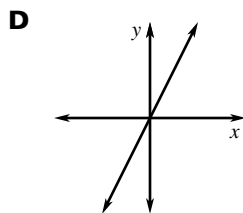
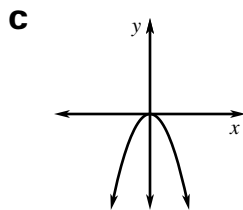
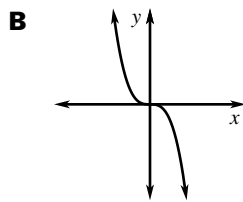
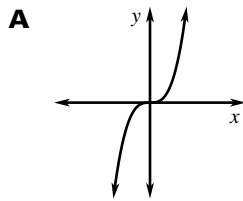
- 8**
- What type of correlation exists between money spent and money saved?



- F** positive correlation
G negative correlation
H constant correlation
J relatively no correlation

SPI 0706.1.3 (continued)

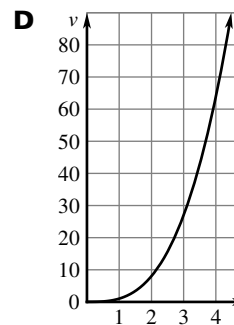
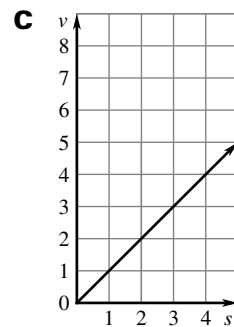
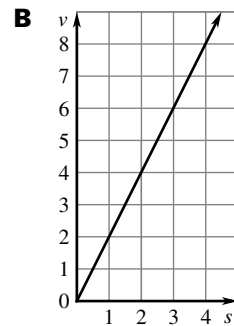
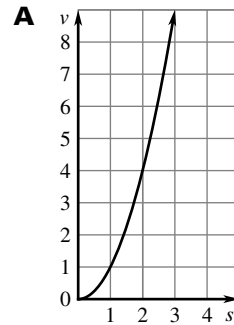
- 9**
- Which could be the graph of
- $y = -2x^3$
- ?



- 10**
- Which of the following best describes the relationship between the number of classrooms in a school and the number of students who attend the school?

- F** relatively no correlation
G negative correlation
H positive correlation
J constant correlation

- 11**
- Which graph shows a proportional relationship of 1 to 2?



SPI 0706.1.4

Use scales to read maps.

- 1** The map of the school has a scale of $\frac{1}{2}$ inch: 5 yards. The distance from the library to the cafeteria is $1\frac{1}{2}$ inches on the map. How far is the library from the cafeteria?
- A** 15 yd
B 20 yd
C 25 yd
D 30 yd
- 2** The scale on a map is 1 cm: 15 km. Find the actual distance in kilometers for a distance on the map that is 4.5 centimeters.
- F** 0.3 km
G 3 km
H 18.5 km
J 67.5 km
- 3** On a map, the distance from San Francisco, CA to Baltimore, MD is 7 inches. If the actual distance from San Francisco to Baltimore is 2,800 miles, what is the scale of the map?
- A** 1 in.: 7 mi
B 1 in.: 400 mi
C 1 in.: 2,800 mi
D 1 in.: 19,600 mi

SPI 0706.1.4 (continued)

- 4** The distance from Juan's house to his aunt's house is $4\frac{1}{2}$ inches on a map. If the map scale is 1 in.: $\frac{1}{4}$ mi, what is the actual distance?

F $\frac{1}{4}$ mi
G $1\frac{1}{8}$ mi
H $4\frac{1}{2}$ mi
J 18 mi

- 5** The scale on a map is 5 in.: 15 mi. The distance on the map from the high school to the mall is 3 inches. What is the actual distance?

A 5 mi
B 9 mi
C 25 mi
D 55 mi

- 6** A map has a scale of 4 cm: 25 km. What actual distance corresponds to 21 centimeters?

F 5.25 km
G 33.6 km
H 131.25 km
J 175 km

- 7** The scale on a map is 1 in.: 250 mi. What distance on the map represents 400 miles?

A $\frac{3}{5}$ in.
B $\frac{5}{8}$ in.
C $1\frac{3}{5}$ in.
D 2 in.

SPI 0706.2.1

Simplify numerical expressions involving rational numbers.

- 1** Which fraction is equivalent to $\left(\frac{2}{3}\right)^3$?

A $\frac{8}{27}$
B $\frac{4}{9}$
C $\frac{2}{3}$
D $\frac{8}{9}$

- 2** Evaluate the expression below.

$$1.5 + 2.1 \times 1.3$$

F 4.23
G 4.68
H 4.9
J 47

- 3** Simplify $\left(\frac{1}{4} + \frac{1}{2}\right)\frac{1}{3}$.

A $\frac{1}{9}$
B $\frac{1}{6}$
C $\frac{1}{4}$
D $\frac{1}{3}$

- 4** Simplify the expression below.

$$\frac{1.25}{0.5} \times 2$$

F 0.125
G 1.25
H 2.5
J 5

SPI 0706.2.1 (continued)

5 What is $\frac{\frac{1}{2}}{\frac{3}{4}}$ written in simplest form?

A $\frac{3}{8}$

B $\frac{2}{3}$

C $\frac{3}{2}$

D $\frac{8}{3}$

6 Evaluate the expression below.

$$\frac{4^5}{2^3} - 3^2 \times 2$$

F -14

G -10

H 110

J 238

7 Simplify the expression below.

$$\frac{4.2}{0.7} \times 3$$

A 0.003

B 0.05

C 0.5

D 5

8 Evaluate the expression below.

$$16.5 - 2.42 \times 1.3$$

F -14.96

G -1.001

H 13.354

J 18.304

SPI 0706.2.2

Compare rational numbers using appropriate inequality symbols.

- 1** Select the symbols to complete this inequality.

$$1\frac{3}{5} \text{ ____ } 1.625 \text{ ____ } 1\frac{7}{8}$$

- A** $>, >$
B $>, <$
C $<, <$
D $<, >$

- 2** Which inequality is true?

- F** $\frac{1}{10} \leq 0.1$
G $\frac{7}{10} < 0.07$
H $\frac{10}{15} < 0.5$
J $\frac{14}{15} < 0.9$

- 3** Which value of p does not make this inequality true?

$$1.9 > p > 0.875$$

- A** $\frac{7}{8}$
B $\frac{7}{5}$
C $\frac{9}{7}$
D $\frac{9}{8}$

SPI 0706.2.2 (continued)**4** Which inequality is true?

F $\sqrt{25} \geq 6$

G $\frac{5}{8} \geq 0.875$

H $\frac{\sqrt{81}}{9} \geq 1$

J $0.25 \leq \frac{1}{5}$

5 Which statement is true?

A $\sqrt{25} > \sqrt{64} < \sqrt{144}$

B $\sqrt{25} < \sqrt{64} > \sqrt{144}$

C $\sqrt{25} > \sqrt{64} > \sqrt{144}$

D $\sqrt{25} < \sqrt{64} < \sqrt{144}$

6 Which value of m makes this inequality true?

$$\frac{1}{8} < m \leq \frac{\sqrt{9}}{4}$$

F 6

G 0.6

H 0.06

J 0.006

SPI 0706.2.3

Use rational numbers and roots of perfect squares/cubes to solve contextual problems.

- 1** The volume of a cube is about 96 cubic inches. What is the approximate length of one side of the cube?

A 3 in.
B 5 in.
C 8 in.
D 10 in.

- 2** Carter's square mosaic tabletop has an area of $12\frac{1}{4}$ square feet. What is the perimeter of the tabletop?

F $3\frac{1}{2}$ ft
G $12\frac{1}{4}$ ft
H 14 ft
J 49 ft

- 3** Edna is decorating a cube for the classroom. She wants to put a frame around one face. The cube has a volume of $421\frac{7}{8}$ cm³. How much framing material does she need?

A 7.50 cm
B 30.00 cm
C 56.25 cm
D 1,687.50 cm

SPI 0706.2.3 (continued)

- 4** A cube has a volume of 15.625 cubic inches. You want to paint 3 faces green and 3 faces yellow. What is the surface area of the green faces?

F $46\frac{7}{8}\text{ in.}^2$

G $21\frac{5}{8}\text{ in.}^2$

H $18\frac{3}{4}\text{ in.}^2$

J $15\frac{5}{8}\text{ in.}^2$

- 5** Bryan has a square tablecloth with an area of $30\frac{1}{4}\text{ ft}^2$. Carla's square tablecloth is 6 feet wide.

Which statement is true?

A Carla's tablecloth is bigger.

B Bryan's tablecloth is bigger.

C Bryan's tablecloth is wider than Carla's.

D Carla's tablecloth is shorter than Bryan's.

- 6** The area of the new square deck is 90.25 ft^2 . Stella is building a bench along one side. What is the maximum length for the bench?

F $9\frac{1}{2}\text{ ft}$

G 19 ft

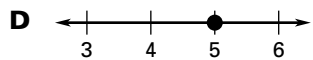
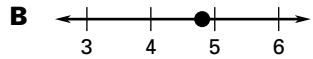
H 38 ft

J $90\frac{1}{4}\text{ ft}$

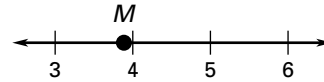
SPI 0706.2.4

Determine the approximate location of square/cube roots on a number line.

- 1** Which number line best represents the approximate location of $\sqrt{16}$?



- 2** Point M represents the approximate location of which number?



F $\sqrt[3]{64}$

G $\sqrt[3]{62}$

H $\sqrt[3]{27}$

J $\sqrt[3]{20}$

- 3** On a number line, the positive square root of 39 is between

- A** 3 and 4
B 5 and 6
C 6 and 7
D 38 and 40

SPI 0706.2.4 (continued)

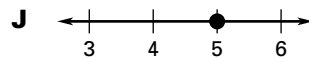
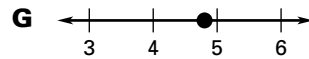
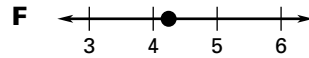
- 4** On a number line, the positive square root of 120 is between

F 9 and 10
G 10 and 11
H 11 and 12
J 12 and 13

- 5** On a number line, $-\sqrt{51}$ is between

A -8 and -7
B -7 and -6
C 6 and 7
D 7 and 8

- 6** Which number line best represents the approximate location of $\sqrt[3]{125}$?



SPI 0706.2.5

Solve contextual problems that involve operations with integers.

- 1** The temperature in Memphis was 42°F at 1:00 A.M. During the next 3 hours, the temperature dropped by 5 degrees Fahrenheit. What was the temperature in Memphis at 4:00 A.M.?

A 37°F
B 45°F
C 47°F
D 50°F

- 2** In the first year of operation, a company has an operating loss of \$22,000. Each year thereafter, this index of performance is improved by \$7,000. What is the operating loss or profit in year five?

F \$8,000 loss
G \$1,000 loss
H \$6,000 profit
J \$13,000 profit

- 3** Julie has \$7 more than twice the amount of money Mark has. If Julie has \$35, how much money does Mark have?

A \$14
B \$21
C \$77
D \$84

SPI 0706.2.5 (continued)

- 4** The inequality $3x - 20,000 \leq 35,000$ represents the amount of money x the bank will lend Emily for a new car. Which of the following is one reasonable solution to this inequality?

F $x = -5000$

G $x = -1000$

H $x = 3000$

J $x = 25,000$

- 5** The amount Kevin can spend on his car payment each month is represented by the inequality $12x + 20,000 < 25,000$. Which could not be the amount of Kevin's monthly car payment?

A $x = 100$

B $x = 225.45$

C $x = 400$

D $x = 417$

- 6** Which is always true about the number $3m$?

F $3m$ is positive.

G $3m$ is odd.

H $3m$ is a multiple of 3.

J $3m$ is not zero.

- 7** Which two numbers have a distance of 18 between them on a number line?

A 4 and -5

B -5 and 13

C 18 and -18

D -16 and -2

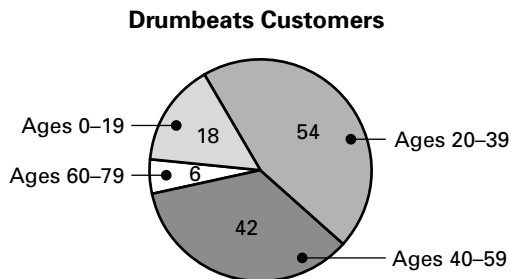
SPI 0706.2.6

Express the ratio between two quantities as a percent, and a percent as a ratio or fraction.

- 1** Which is equivalent to 5.2?

A 0.052%
B 5.2%
C 52%
D 520%

- 2** The circle graph below shows the ages of customers at Drumbeats Record Store during one day. Use the circle graph for Exercises 2–3.



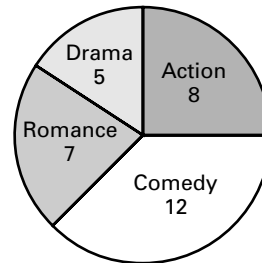
What percent of the customers are in the age group 60–79?

F 5%
G 6%
H 12%
J 15%

- 3** What percent of the customers are less than 40 years old?

A 60%
B 72%
C 95%
D 114%

- 4** The circle graph below shows favorite movies among students in Peter's class. Use the circle graph for Exercises 4–5.



What percent of students chose action?

F 12%
G 25%
H 50%
J 75%

SPI 0706.2.6 (continued)

5 What percent of students did not choose comedy?

- A** 8%
- B** 24%
- C** 25%
- D** 62.5%

6 Michael wants to buy a pair of shoes that costs \$45. His mother will pay \$13 of the cost. About what percent of the cost will Michael's mother pay?

- F** 15%
- G** 29%
- H** $33.\bar{3}\%$
- J** 71%

7 Deon's team had the football for 27 minutes during a 60 minute football game. What percent of the game did Deon's team have the ball?

- A** 22%
- B** 33%
- C** 45%
- D** 55%

8 Out of 72 raffle entries, 4 received prizes. About what percent of the entries received a prize?

- F** 6%
- G** 34%
- H** 87%
- J** 94%

SPI 0706.2.6 (continued)

- 9** A student answered 48 questions correctly on a quiz with 55 questions. About what percent of the questions did the student answer correctly?
- A** 80%
B 87%
C 90%
D 98%
- 10** Which of the following is equivalent to $\frac{1}{4}$?
- F** 0.04%
G 4%
H 14%
J 25%
- 11** Last year 500 students voted in the school election. This year 560 students voted. What is the percent increase from last year to this year?
- A** 10%
B 12%
C 60%
D 89%
- 12** What percent of 25 is 21?
- F** 8.4%
G 21%
H 84%
J 119%

SPI 0706.2.6 (continued)

- 13** Last month, Paul had 230 baseball cards in his collection. This month, he has 310 baseball cards. By about what percent did the size of his collection increase from last month to this month?

A 26%
B 35%
C 80%
D 120%

- 14** In Charlie's math class, 2 out of every 7 students play basketball. About what percent of students in Charlie's math class play basketball?

F 14%
G 27%
H 29%
J 40%

- 15** Kim played 45 out of the 50 minutes of her soccer game. What percent of the game did she play?

A 5%
B 45%
C 50%
D 90%

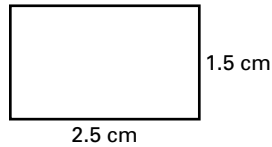
- 16** In 2005, Lou's baseball team scored 200 runs. In 2006, the team scored 175 runs. What is the percent decrease in runs scored from 2005 to 2006?

F 12.5%
G 14%
H 25%
J 87.5%

SPI 0706.2.7

Use ratios and proportions to solve problems.

- 1** The length of the rectangle in the drawing is 2.5 centimeters. The actual length is 20 feet. What is the actual width?

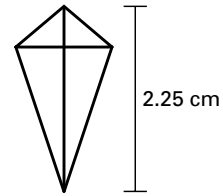


- A** 8 ft
- B** 12 ft
- C** 30 ft
- D** 33 ft

- 2** A tree in a drawing is 1 centimeter tall. The actual tree is 12 feet tall. What is the scale?

- F** 1 cm:1 ft
- G** 1 in.:12 ft
- H** 12 cm:1 ft
- J** 1 cm:12 ft

- 3** The drawing of the kite was made using a scale of 1 cm : 3 ft. What is its actual length?



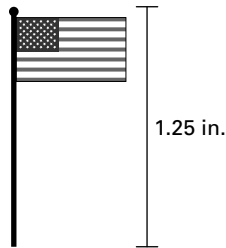
- A** 4 ft
- B** 5.25 ft
- C** 6 ft
- D** 6.75 ft

- 4** Daniel used a scale of 3 inches to 100 feet to build a model of a building. If the model is 15 inches tall, how tall is the building?

- F** 20 ft
- G** 150 ft
- H** 500 ft
- J** 1,500 ft

SPI 0706.2.7 (continued)

- 5** The drawing of the flagpole was made using a scale of 1 inch to 24 feet.



What is the actual height of the flagpole?

- A** 19.2 in.
B 30 in.
C 19.2 ft
D 30 ft
- 6** A bedroom is 14 feet long and 12 feet wide. On a blueprint the width of the bedroom is $\frac{3}{2}$ inches. What is the length on the blueprint?
- F** $\frac{9}{7}$ in.
G $\frac{7}{4}$ in.
H 8 in.
J $\frac{28}{3}$ in.

- 7** Ethan's dog has a mass of 8 kilograms. About how much does the dog weigh in pounds? (1 lb \approx 0.454 kg)

A 0.06 lb
B 4 lb
C 18 lb
D 28 lb

- 8** You compete in a 15 kilometer bicycle race. About how many miles is the race? (1 mi \approx 1.609 km)

F 1.5 mi
G 9 mi
H 15 mi
J 24 mi

SPI 0706.2.7 (continued)

- 9** Ruby is 1.5 meters tall. About how tall is she in feet and inches? (1 in. = 2.54 cm)

A 1 ft 6 in.
B 4 ft 9 in.
C 4 ft 11 in.
D 7 ft 1 in.

- 10** Alex reads about 60 pages each hour. About how many pages can he read in 1.5 hours?

F 40
G 60
H 90
J 120

- 11** Jared estimates it will take 48 person-hours to paint the library in the school. Four people are painting and each person works 4 hours per day. How many days will it take to paint the library?

A 3
B 4
C 12
D 15

- 12** A robot moves 2 inches in 5 seconds. At this rate, how many feet will the robot move in 5 minutes?

F 10 ft
G 20 ft
H 50 ft
J 120 ft

SPI 0706.2.7 (continued)

- 13** A table has an area of 972 square inches. What is the area in square feet?

A 6.75 ft²
B 9 ft²
C 81 ft²
D 11,664 ft²

- 14** If a square has an area of 36 square feet, what is the area in square inches?

F 0.25 in.²
G 3 in.²
H 432 in.²
J 5,184 in.²

- 15** A solid has a volume of 245.7 cubic centimeters. What is the approximate volume in cubic inches? ($1 \text{ in.}^3 \approx 16.38 \text{ cm}^3$)

A 0.07 in.³
B 15 in.³
C 96.73 in.³
D 4,024 in.³

- 16** Andre is packing boxes that have a weight limit of 10 kilograms each. How many boxes does he need to pack 110 pounds? ($1 \text{ kg} \approx 2.2 \text{ lb}$)

F 5
G 22
H 24
J 25

SPI 0706.3.1

Evaluate algebraic expressions involving rational values for coefficients and/or variables.

- 1** If $d = 8$ and $k = 3$, then to evaluate $dk + (d - k)^2$ you would first

A add d to k
B subtract k from d
C multiply d by k
D square k

- 2** Evaluate $12d - d^2$ when $d = 7$.

F 35
G 77
H 133
J 144

- 3** Evaluate $(3a - 2b)^2$ when $a = 3$ and $b = 1$.

A 14
B 49
C 85
D 121

- 4** If $a = 3$ and $b = 6$, then evaluate $\frac{a^2 + b}{3}$.

F 3
G 4
H 5
J 13

SPI 0706.3.1 (continued)

5 What is $\frac{5x^2y}{15x^6y^3}$ written in simplest form?

- A** $\frac{1}{3x^4y^2}$
- B** $3x^4y^2$
- C** $\frac{1}{3x^3y^3}$
- D** $\frac{1}{10x^4y^2}$

6 Evaluate $10 - r + 15 \div s$ when $r = 4$ and $s = 3$.

- F** 3
- G** 7
- H** 9
- J** 11

7 Evaluate $ab - 2a$ when $a = 6$ and $b = 3$.

- A** 6
- B** 12
- C** 36
- D** 96

8 Evaluate $g^2 + h^3$ when $g = 3$ and $h = 4$.

- F** 18
- G** 43
- H** 73
- J** 79

SPI 0706.3.1 (continued)

- 9** Evaluate $pq - 2(3)$ when $p = 9$ and $q = 4$.

A 12
B 30
C 54
D 102

- 10** Evaluate $y(x^2 - 1)$ when $x = 3$ and $y = 2$.

F 9
G 10
H 16
J 17

- 11** Evaluate $f + (2f - j)^2$ when $f = 5$ and $j = 4$.

A -1
B 14
C 41
D 89

- 12** Evaluate $-(-ab)^3$ when $a = -2$ and $b = -1$.

F -8
G -6
H 6
J 8

SPI 0706.3.1 (continued)

13 Evaluate $\frac{m+n}{n-2}$ when $m = 16$ and $n = 8$.

- A** 1
- B** 4
- C** 6
- D** 24

14 Evaluate $\frac{5x+y^2}{x-y}$ when $x = 6$ and $y = 5$.

- F** 5
- G** 40
- H** 55
- J** 61

15 What is $6 + 2a - a \div b$ when $a = 8$ and $b = 2$?

- A** 7
- B** 10
- C** 18
- D** 26

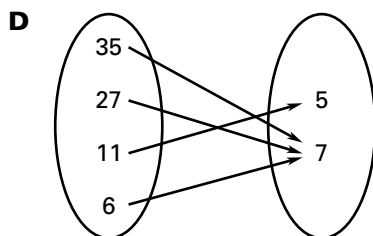
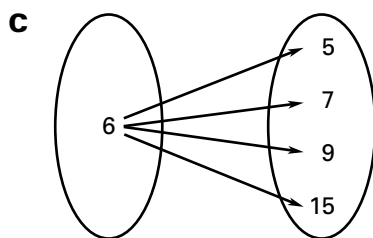
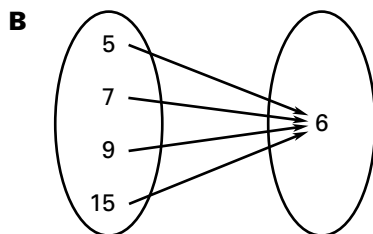
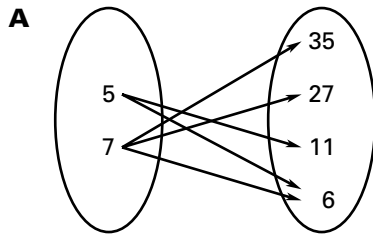
16 What is $-2(5 - 4x)$ when $x = 3$?

- F** -22
- G** -14
- H** -9
- J** 14

SPI 0706.3.2

Determine whether a relation (represented in various ways) is a function.

- 1** Which mapping represents a relation that is a function?



- 2** Which shows a relation that is a function?

- F** list of furniture with 4 legs
- G** coaches and number of losses and wins
- H** Memphis high temperatures in August
- J** list of friends and number of pets

- 3** This set of ordered pairs represents a function.

$\{(1, 2), (2, 4), (3, 8), (4, 16)\}$

Which ordered pair could be included in the set so that it still represents a function?

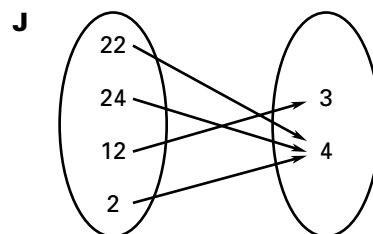
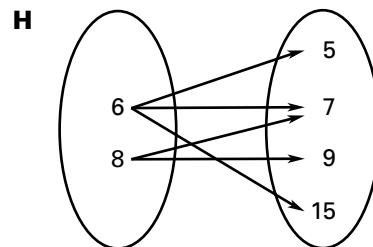
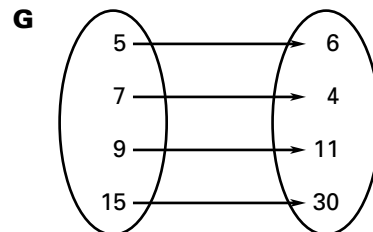
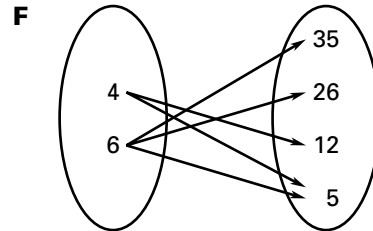
- A** $(0, 1)$
- B** $(0, 2)$
- C** $(2, 0)$
- D** $(2, 2)$

SPI 0706.3.2 (continued)**4** Which shows a relation that is a function?

- F** list of classmates and number of siblings
- G** classmates and weekly allowance received
- H** cities with 90°F temperatures in August
- J** number of television sets in each house

5 Which set of ordered pairs represents a function?

- A** $\{(1, 2), (2, 2), (1, 6), (4, 2)\}$
- B** $\{(7, 3), (7, 9), (7, 13), (7, 54)\}$
- C** $\{(1, 3), (2, 9), (3, 27), (4, 81)\}$
- D** $\{(1, 3), (9, 2), (3, 2), (9, 12)\}$

6 Which mapping represents a relation that is a function?

SPI 0706.3.3

Given a table of inputs x and outputs $f(x)$, identify the function rule and continue the pattern.

- 1** Which equation models the function in the table if c represents the cost and n represents the number of pizzas?

n	1	2	3	4
c	7	12	17	22

- A** $c = 7n$
B $c = 6n + 1$
C $c = 10n - 3$
D $c = 5n + 2$

- 2** What are the missing values in the table, given that $y = 2x - 5$?

x	y
1	-3
2	-1
3	?
4	?

- F** 3, 1
G -1, -3
H -3, -1
J 1, 3

- 3** Look at the input-output table. What is the rule for this function?

Input	Output
3	12
1	6
-2	-3

- A** $f(x) = 3x + 3$
B $f(x) = x^2 + 3$
C $f(x) = 2x + 1$
D $f(x) = x^2 + 5$

SPI 0706.3.3 (continued)

- 4** The table represents a bus schedule where buses run every 12 minutes during the morning commute. What are the next two entries in the table?

Bus Number	Time
1	6:17 A.M.
2	6:29 A.M.
3	?
4	?

- F** 6:31 A.M.; 6:43 A.M.
G 6:41 A.M.; 6:53 A.M.
H 6:51 A.M.; 7:03 A.M.
J 6:50 A.M.; 7:11 A.M.

- 5** Maria's car averages 25 miles per gallon on the highway. Maria fills up the tank, which holds 16 gallons, and starts on a trip.

Miles traveled	50	125	250	350
Gallons remaining				

What are the entries in the table?

- A** 25, 22, 17, 13
B 16, 13, 8, 3
C 14, 11, 6, 2
D 16, 15, 14, 13

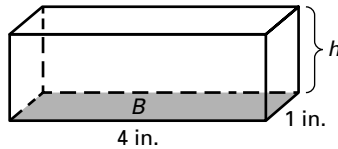
- 6** Complete the table for $f(x) = x^2 + 3x - 2$.

x	y
0	
2	
4	

- F** 0, 4, 5
G -2, 4, 24
H -2, 8, 24
J -2, 8, 26

SPI 0706.3.3 (continued)

- 7** In the rectangular prism below, the area of base B is 4 square inches.



Which table shows the relationship between the height h of this prism and its volume? ($V = Bh$)

- A**
- | | | | | |
|---------------------------------|---|---|---|---|
| Height (in.) | 1 | 2 | 3 | 4 |
| Volume (in.³) | 1 | 2 | 3 | 4 |
- B**
- | | | | | |
|---------------------------------|---|---|---|----|
| Height (in.) | 1 | 2 | 3 | 4 |
| Volume (in.³) | 1 | 4 | 9 | 16 |
- C**
- | | | | | |
|---------------------------------|---|---|----|----|
| Height (in.) | 1 | 2 | 3 | 4 |
| Volume (in.³) | 4 | 8 | 12 | 16 |
- D**
- | | | | | |
|---------------------------------|---|---|----|----|
| Height (in.) | 1 | 2 | 3 | 4 |
| Volume (in.³) | 1 | 8 | 27 | 64 |

- 8** Identify the best rule for this pattern.

4	-16	64	-256	1024
---	-----	----	------	------

- F** The numbers are multiplied by -4 .
G The numbers are multiplied by 8.
H The numbers are increasing by 4.
J The numbers are increasing by 12.

- 9** Look at the input-output table. What is the rule for this table?

Input	Output
3	10
4	13
-5	-14

- A** $y = x + 4$
B $y = 3x + 13$
C $y = -4x + 34$
D none of the above

SPI 0706.3.3 (continued)

- 10** The area of the base B of a rectangular prism is 9 square centimeters. Which table shows the relationship between the height h of this prism and its volume? ($V = Bh$)

F

Height (cm)	1	2	3	4
Volume (cm³)	1	2	3	4

G

Height (cm)	1	2	3	4
Volume (cm³)	1	8	27	64

H

Height (cm)	1	2	3	4
Volume (cm³)	9	18	27	36

J

Height (cm)	1	2	3	4
Volume (cm³)	10	15	20	30

- 11** The cost of parking a car in a parking lot is shown in the table below. How much will it cost to park for 7 hours?

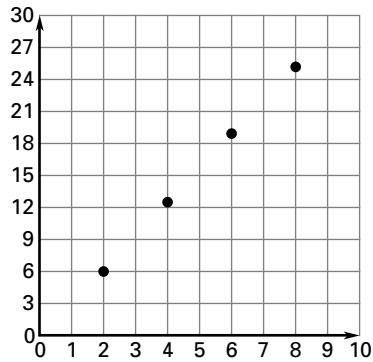
Hours	1	2	3	4	n
Cost	\$4	\$5.50	\$7.00	\$8.50	?

- A** \$13
B \$14.50
C \$28
D \$38.50

SPI 0706.3.4

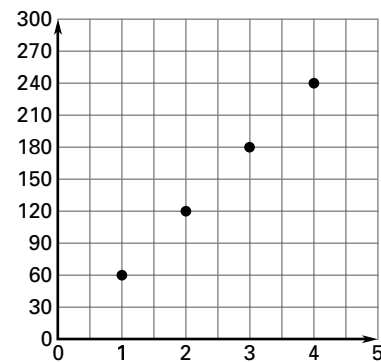
Interpret the slope of a line as a unit rate given the graph of a proportional relationship.

- 1** Which of the following relationships is best represented by the data in the graph?



- A** The side length of a square, x , and its area, y
- B** The diameter of a circle, x , and its circumference, y
- C** The base of a 10-inch high triangle, x , and its area, y
- D** The side length of a cube, x , and its volume, y

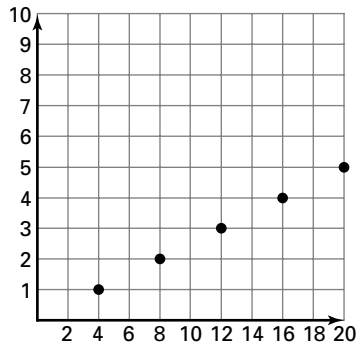
- 2** Which of the following relationships is best represented by the data in the graph?



- F** conversion of hours to seconds
- G** conversion of seconds to hours
- H** conversion of seconds to minutes
- J** conversion of minutes to seconds

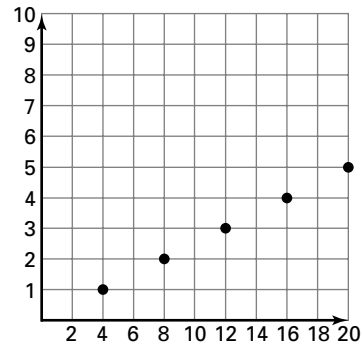
SPI 0706.3.4 (continued)

- 3** Which of the following relationships is best represented by the data in the graph?



- A** conversion of feet to yards
- B** conversion of quarts to gallons
- C** conversion of ounces to cups
- D** conversion of cups to pints

- 4** Which of the following relationships is best represented by the data in the graph?



- F** perimeter of square compared to length of side
- G** area of square compared to length of side
- H** volume of cube compared to length of side
- J** area of rectangle compared to length of side

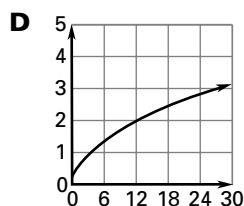
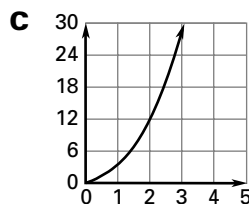
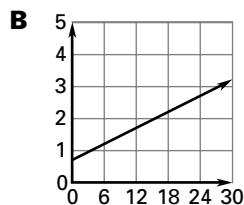
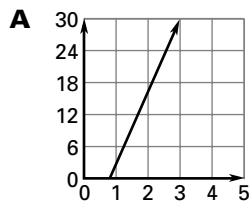
SPI 0706.3.5

Represent proportional relationships with equations, tables and graphs.

- 1** The data in the table below show the relationship between the radius of a circle in centimeters, x , and its approximate area in square centimeters, y .

Radius in centimeters, x	Area in square centimeters, y
1	3
2	12
3	27

Which graph best represents the data in the table above?



- 2** Look at the input-output table. What is the rule for this table?

Input	Output
3	10
4	13
-5	-14

- F** $y = x + 4$
G $y = 3x + 13$
H $y = -4x + 34$
J none of the above

SPI 0706.3.5 (continued)

- 3**
- Use the information in the table.

2000 Census Data for Harlan County	
Gender	Total
Females	15,500
Males	29,040

Which equation can be used to find the total population of Harlan County?

- A** $15,500 + x = 29,040$
B $29,040 - 15,500 = x$
C $15,500 - x = 29,040$
D $15,500 + 29,040 = x$

- 4**
- Karen is starting a workout routine. She plans to increase the number of sit-ups she does each day by 5. Which item best represents her plan?

F $s = 5d$

G

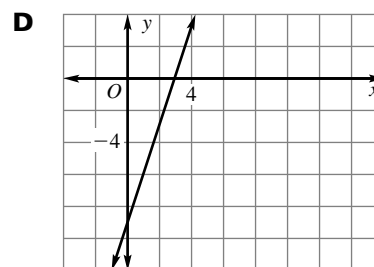
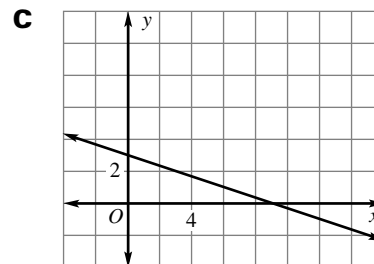
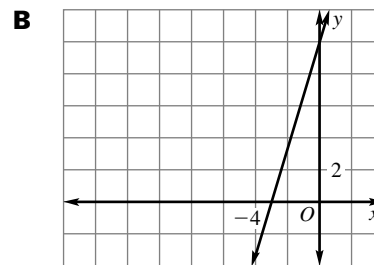
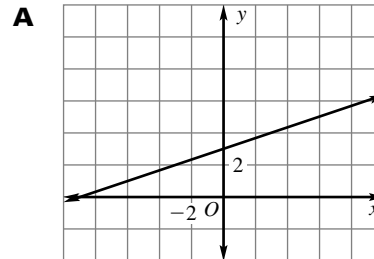
Day	1	2	3	4	5
Sit-ups	20	25	30	35	40

H

Day	5	10	15	20	25
Sit-ups	20	25	30	35	40

J $s = d \div 5$

- 5**
- Which of the following is the graph of
- $y = \frac{1}{3}x + 3$
- ?

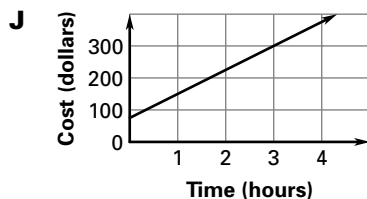
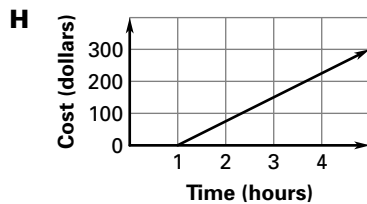
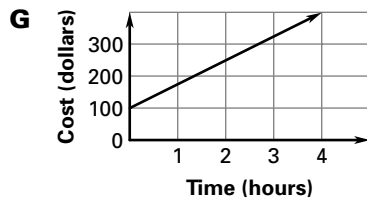
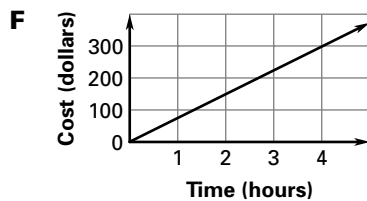


SPI 0706.3.5 (continued)

- 6** The table shows how much it costs to have a plumber fix a broken pipe.

Times (hours)	0	1	2	3	4
Cost (\$)	100	175	250	325	400

Which graph best represents the data?



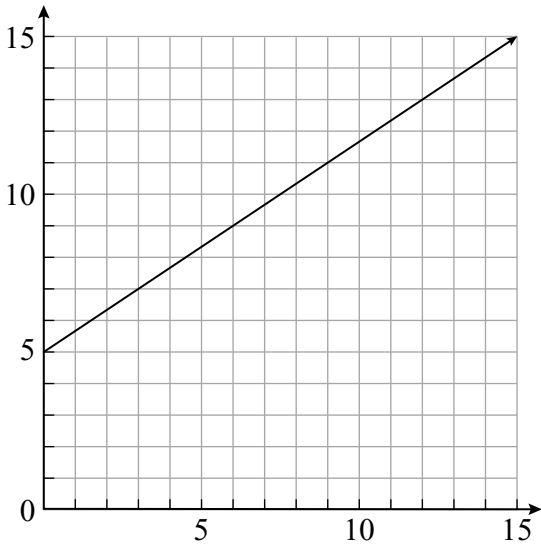
- 7** The table shows how the number of students attending a play determines the total cost of their tickets. Which equation describes this relationship?

x	y
10	250
15	375
22	550
31	775

- A** $x = 25y$
B $y = 25x$
C $y = x + 240$
D $y = \frac{25}{x}$

SPI 0706.3.5 (continued)

- 8** Which table of ordered pairs below is shown on this graph?



F

x	0	1	2	3
y	0	3	6	9

G

x	0	3	6	9
y	0	3	6	9

H

x	0	2	4	6
y	0	3	6	9

J

x	0	3	6	9
y	5	7	9	11

SPI 0706.3.6

Solve linear equations with rational coefficients symbolically or graphically.

1 What is the solution to $-\frac{2}{5}r = -10$?

- A** -25
- B** -4
- C** 4
- D** 25

2 What value of c makes the equation below true?

$$-5c - 14 = -4$$

- F** -3
- G** -2
- H** -1
- J** 0

3 What value of h makes the equation below true?

$$-1.2h + 6 = 29$$

- A** -12.5
- B** -2.5
- C** 2.5
- D** 12.5

SPI 0706.3.6 (continued)

- 4** Which of the following is the second step to a correct solution for the equation?

$$2y + 2.5 = 10$$

- F** Add 2.5 to both sides.
- G** Subtract 2.5 from both sides.
- H** Multiply both sides by 2.
- J** Divide both sides by 2.

- 5** Which equation has a solution of 4?

- A** $1 - 6x = 25$
- B** $6x + 13 = 31$
- C** $9 + 6x = 15$
- D** $6x - 19 = 5$

- 6** Mariah bought several pencils that cost 30¢ each. She also bought a notebook for \$2.50. Altogether she spent \$7. The equation below can be used to find p , the number of pencils Mariah bought.

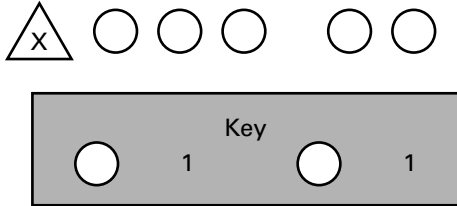
$$0.30p + 2.50 = 7$$

How many pencils did Mariah buy?

- F** 4
- G** 5
- H** 15
- J** 31

SPI 0706.3.6 (continued)

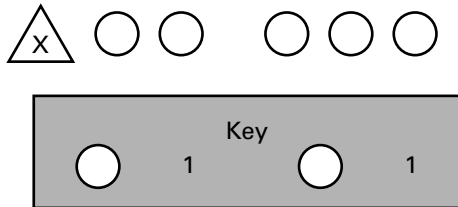
- 7** The model represents the equation $x + 3 = -2$.



What is the value of x ?

- A** $x = -6$
B $x = -5$
C $x = 1$
D $x = 5$

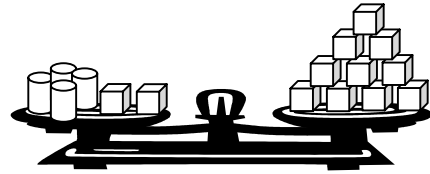
- 8** The model represents the equation $x - 2 = 3$.



What is the value of x ?

- F** $x = -6$
G $x = -5$
H $x = 1$
J $x = 5$

- 9** The model represents the equation $4x + 2 = 10$.



What is the value of x ?

- A** $x = 2$
B $x = 2.5$
C $x = 3$
D $x = 10$

- 10** The model represents the equation $2x + 1 = 4$.



What is the value of x ?

- F** $x = 1$
G $x = 1.5$
H $x = 2$
J $x = 2.5$

SPI 0706.3.6 (continued)

- 11** What is the first step in solving the equation $3x - 6 = 24$?
- A** Divide both sides of the equation by 3.
 - B** Multiply both sides of the equation by 3.
 - C** Add 6 to both sides of the equation.
 - D** Subtract 6 from both sides of the equation.

- 12** What is the second step in solving the equation $\frac{1}{2}x + 16 = 14$?
- F** Multiply both sides of the equation by 2.
 - G** Subtract 16 from both sides of the equation.
 - H** Add 16 to both sides of the equation.
 - J** Divide both sides of the equation by 2.

SPI 0706.3.7

Translate between verbal and symbolic representations of real-world phenomena involving linear equations.

- 1** Which expression represents the phrase *the sum of twice a number and 7*?

A $2 + n + 7$
B $n + 2(7)$
C $2n + 7$
D $2n(7)$

- 2** In Kyle's class the number of boys b is 3 more than the number of girls g . Which equation matches this information?

F $b + g = 3$
G $g = b + 3$
H $b = g + 3$
J $3b = 3g$

- 3** Which equation represents the statement *the product of 3 and a number is 11*?

A $3n = 11$
B $11n = 3$
C $n + 3 = 11$
D $n + 11 = 3$

- 4** Cho has 4 times as many dimes d as she has quarters q . Which equation represents this situation?

F $4d = q$
G $4q = d$
H $dq = 4$
J $4d = 4q$

SPI 0706.3.7 (continued)

- 5** Which equation represents the statement *the product of 6 and a number is twice the sum of the number and 2*?

A $6n = 2 + n + 2$
B $6 + n = 2n + 2$
C $6 + n = 2(n + 2)$
D $6n = 2(n + 2)$

- 6** Subtract 3 from a number and divide the result by 5. The answer is 20.
Which equation matches these statements?

F $n - \frac{3}{5} = 20$
G $n - 3 \div 5 = 20$
H $\frac{n-3}{5} = 20$
J $n - 3 = 5$

- 7** Subtract 4 from a number and multiply the result by 5. The answer is 75.

Which equation matches these statements?

A $4 - n = 75$
B $n - 4 = 75$
C $5(n - 4) = 75$
D $5n - 4 = 75$

- 8** Which equation represents the statement *35 more than a number n is two times the sum of n and 7*?

F $n + 35 = 2n + 7$
G $n + 35 = 2n$
H $n + 35 = 2(n + 7)$
J $35 = 2n + 7$

SPI 0706.3.8

Solve contextual problems involving two-step linear equations.

- 1** The equation $C = \frac{5}{9}(F - 32)$ shows the relationship between the temperature in degrees Fahrenheit (F) and the temperature in degrees Celsius (C). When the temperature is 40°C , what is the temperature in degrees Fahrenheit?

A 4°F
B 54°F
C 104°F
D 114°F

- 2** Brenda, Julie and Carlotta collect buttons. Together they have 78 buttons. Brenda has half as many buttons as Julie, and Carlotta has 3 times as many buttons as Brenda. How many buttons does Brenda have?

F 7 buttons
G 8 buttons
H 9 buttons
J 13 buttons

- 3** Bananas cost \$.50 per pound. Ken bought a gallon of milk that costs \$4.25 and some bananas. If Ken spent a total of \$5.50, how many pounds of bananas did he buy?

A 0.625 lb
B 2.5 lb
C 5 lb
D 10.25 lb

SPI 0706.3.8 (continued)

- 4** Polly picked 2 apples and her sister picked 3 apples. Their mother picked twice the number of apples that Polly and her sister did. How many apples did Polly's mother pick?

F 8
G 12
H 10
J 24

- 5** Marvin spent a total of \$15.75 to buy one roll of film and develop photos. The roll of film cost \$4.95, and each photograph cost \$.30 to develop. How many photographs did Marvin get developed?

A 12 photographs
B 24 photographs
C 36 photographs
D 48 photographs

SPI 0706.3.9

Solve linear inequalities in one variable with rational coefficients symbolically or graphically.

- 1** Jessica is saving money to buy a ticket to a concert. Concert tickets start at \$65. She already saved \$20. Based on the inequality $s + 20 \geq 65$, what is the least amount she still must save?

A \$44
B \$45
C \$46
D \$85

- 2** Nancy works less than 35 hours each week. She has already worked 21 hours this week. Based on the inequality $h + 21 < 35$, which is the greatest number of hours she still can work?

F 13
G 14
H 15
J 56

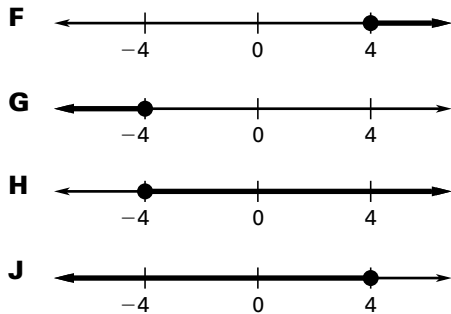
- 3** For which inequality is 8 a solution?

A $y - 7 > 1$
B $5 > w - 4$
C $\frac{x}{3} > 3$
D $3n > 24$

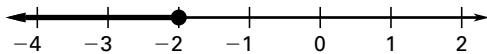
SPI 0706.3.9 (continued)

- 4** Which graph displays the solution of the following inequality?

$$4t \geq 16$$



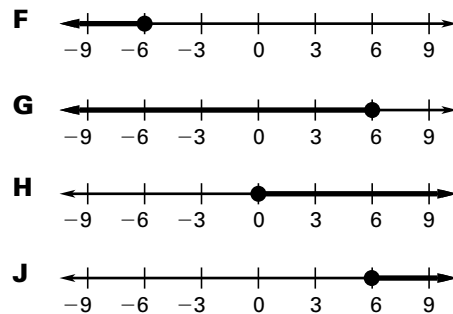
- 5** Which inequality has the following graph as its solution?



- A** $z + 6 \geq 8$
- B** $z + 7 \leq 5$
- C** $z - 9 \leq 11$
- D** $z - 2 \geq -4$

- 6** Which graph displays the solution of the following inequality?

$$3 \leq d - 3$$



SPI 0706.3.9 (continued)

- 7** When a dried flower arrangement that weighs 8 ounces is placed inside a shipping box, the weight of the flowers and the box together is more than 32 ounces. Which inequality represents all possible values for b , the weight in ounces of the box?

A $b > 4$
B $b < 4$
C $b > 24$
D $b < 24$

- 8** Which of the following is the solution to the inequality $m + 5 > 11$?

F $m < 6$
G $m > 6$
H $m > 16$
J $m < 16$

- 9** What is the solution to the inequality below?

$$4x + 10 < 12$$

A $x < -\frac{1}{2}$
B $x > -\frac{1}{2}$
C $x < \frac{1}{2}$
D $x > \frac{1}{2}$

- 10** Each class in Jordan's school collected dimes for charity. The solution to $0.10d + 25 < 200$ represents the number of dimes d each class collected. Which of the following is not a reasonable solution to this inequality?

F $d = -30$
G $d = 0$
H $d = 500$
J $d = 1000$

SPI 0706.3.9 (continued)

- 11** What is the solution to the inequality below?

$$-x + 8 \geq 11$$

- A** $x \leq -3$
- B** $x \geq -3$
- C** $x \leq 3$
- D** $x \geq 3$

- 12** Which is the solution to the inequality below?

$$-5x + 5 \leq -3$$

- F** $x \geq -\frac{8}{5}$
- G** $x \leq -\frac{8}{5}$
- H** $x \geq \frac{8}{5}$
- J** $x \leq \frac{8}{5}$

- 13** What is the solution to the inequality below?

$$\frac{1}{2}x - 3 > 10$$

- A** $x > \frac{7}{2}$
- B** $x > \frac{13}{2}$
- C** $x > 14$
- D** $x > 26$

- 14** Which is the solution to the inequality below?

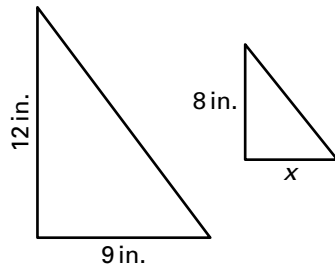
$$-3n + 5 \leq 9$$

- F** $n \leq \frac{4}{3}$
- G** $n \leq -\frac{4}{3}$
- H** $n \geq \frac{4}{3}$
- J** $n \geq -\frac{4}{3}$

SPI 0706.4.1

Solve contextual problems involving similar triangles.

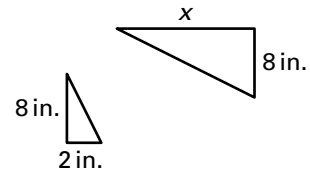
- 1** The two similar triangles shown are patterns used to make patches for a jacket.



What is the value of x , the width of the smaller triangle?

- A** 5 in.
- B** 6 in.
- C** 10.6 in.
- D** 13.5 in.

- 2** The two similar triangles shown are patterns used to make game pieces.

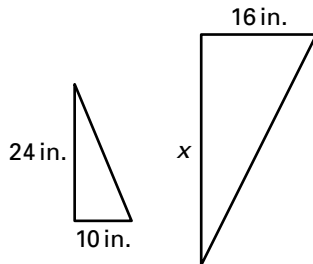


What is the value of x , the length of the larger triangle?

- F** 2 in.
- G** 14 in.
- H** 16 in.
- J** 32 in.

SPI 0706.4.1 (continued)

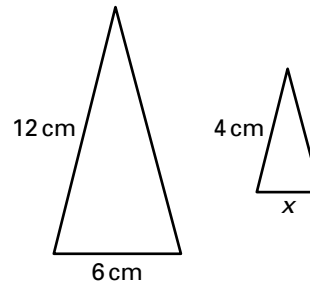
- 3** The two similar triangles shown are patterns used to make a stained glass window.



What is the value of x , the length of the larger triangle?

- A** 6.6 in.
- B** 15 in.
- C** 30 in.
- D** 38.4 in.

- 4** The two similar triangles shown are patterns used to make a quilt.



What is the value of x , the base of the smaller triangle?

- F** 2 cm
- G** 8 cm
- H** 10 cm
- J** 18 cm

SPI 0706.4.2

Use SSS, SAS, and AA to determine if two triangles are similar.

- 1** A triangle has lengths of 24 inches, 32 inches and 48 inches. Which list shows the side lengths of a similar triangle?

A 2 in., 3 in., 3 in.
B 3 in., 4 in., 6 in.
C 12 in., 16 in., 22 in.
D 28 in., 64 in., 96 in.

- 2** A triangle has lengths of 12 centimeters and 16 centimeters with an included angle of 70° . Which list shows the side lengths and included angle of a similar triangle?

F 4 cm, 6 cm, 20°
G 4 cm, 6 cm, 70°
H 36 cm, 48 cm, 20°
J 36 cm, 48 cm, 70°

- 3** A triangle has angles of 35° and 110° . The measure of one side of the triangle is 3 inches. Which list shows the side length and angles of a similar triangle?

A 6 in., 35° , 110°
B 6 in., 55° , 110°
C 6 in., 35° , 80°
D 6 in., 55° , 80°

SPI 0706.4.2 (continued)

- 4** A triangle has lengths of 18 inches, 24 inches and 38 inches. Which list shows the side lengths of a similar triangle?

F 3 in., 4 in., 6 in.
G 9 in., 12 in., 19 in.
H 36 in., 42 in., 30 in.
J 36 in., 42 in., 76 in.

- 5** A triangle has lengths of 45 centimeters and 60 centimeters with an included angle of 37° . Which list shows the side lengths of a similar triangle?

A 5 cm, 7 cm, 37°
B 5 cm, 7 cm, 53°
C 9 cm, 12 cm, 53°
D 9 cm, 12 cm, 37°

- 6** A triangle has angles of 42° and 18° . The measure of one side of the triangle is 15 centimeters. Which list shows the side length and angles of a similar triangle?

F 30 cm, 18° , 42°
G 45 cm, 18° , 48°
H 60 cm, 42° , 72°
J 75 cm, 48° , 72°

SPI 0706.4.3

Apply scale factor to solve problems involving area and volume.

- 1** Two squares are similar. The area of the smaller square is 49 square inches. The area of the larger square is 100 square inches. What is the ratio of the side length of the smaller square to the side length of the larger square?

A $\frac{147}{300}$

B $\frac{49}{100}$

C $\frac{1}{2}$

D $\frac{7}{10}$

- 2** Two squares are similar. The area of the smaller square is 12 square inches. The area of the larger square is 1728 square inches. What is the ratio of the side length of the smaller square to the side length of the larger square?

F $\frac{12}{1,728}$

G $\frac{1}{144}$

H $\frac{1}{12}$

J $\frac{1}{6}$

- 3** Two squares are similar. The area of the smaller square is 256 square inches. The area of the larger square is 324 square inches. What is the ratio of the side length of the smaller square to the side length of the larger square?

A $\frac{256}{324}$

B $\frac{64}{81}$

C $\frac{1}{4}$

D $\frac{8}{9}$

SPI 0706.4.3 (continued)

- 4** Two rectangular solids are similar. The volume of the smaller solid is 6 cubic inches. The volume of the larger solid is 48 cubic inches. What is the ratio of the side length of the smaller rectangular solid to the side length of the larger rectangular solid?

F $\frac{1}{16}$

G $\frac{1}{8}$

H $\frac{1}{4}$

J $\frac{1}{2}$

- 5** Two rectangular solids are similar. The volume of the smaller solid is 81 cubic inches. The volume of the larger solid is 192 cubic inches. What is the ratio of the side length of the smaller rectangular solid to the side length of the larger rectangular solid?

A $\frac{3}{4}$

B $\frac{1}{2}$

C $\frac{27}{64}$

D $\frac{81}{192}$

- 6** Two rectangular solids are similar. The volume of the smaller solid is 24 cubic inches. The volume of the larger solid is 375 cubic inches. What is the ratio of the side length of the smaller rectangular solid to the side length of the larger rectangular solid?

F $\frac{24}{375}$

G $\frac{8}{125}$

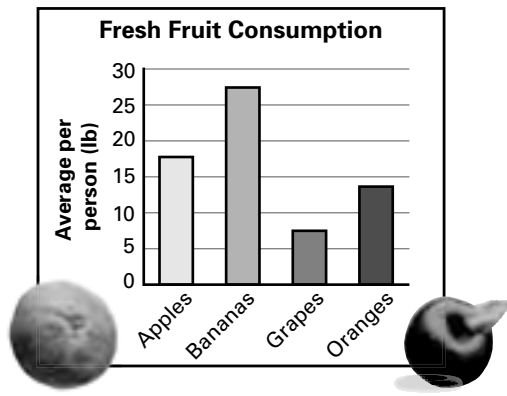
H $\frac{2}{5}$

J $\frac{3}{4}$

SPI 0706.5.1

Interpret and employ various graphs and charts to represent data.

Use the following graph to answer questions 1 to 3.



- 1** According to the graph, which fruit was eaten the least?

A apples
B bananas
C grapes
D oranges

- 2** About how many more pounds of bananas than pounds of oranges were eaten per person?

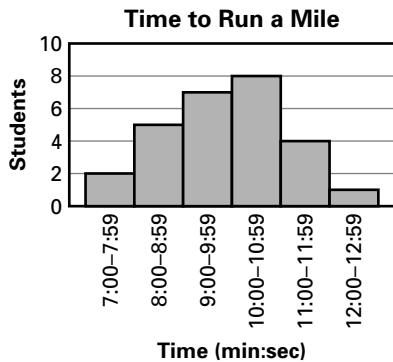
F 10
G 13
H 17
J 20

- 3** What is the approximate total of the pounds of apples and grapes eaten per person?

A 11
B 20
C 25
D 32

SPI 0706.5.1 (continued)

Use the following histogram to answer questions 4 and 5.

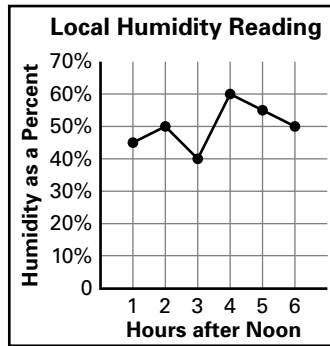


- 4** Which of the following claims is not supported by the data?
- F** One student ran the mile in 12 minutes or more.
 - G** The fastest student ran the mile in 7 minutes and 30 seconds.
 - H** Only two students ran the mile in less than 8 minutes.
 - J** Most students ran the mile in less than 11 minutes.

- 5** Ming claims that more than half the students ran the mile in less than 10 minutes. Is this supported by the data? Explain.
- A** Yes; 14 students ran the mile in less than 10 minutes.
 - B** Yes; the median value is exactly 10 minutes.
 - C** No; less than half the students ran the mile in less than 10 minutes.
 - D** No; most of the class ran the mile in exactly 10 minutes.

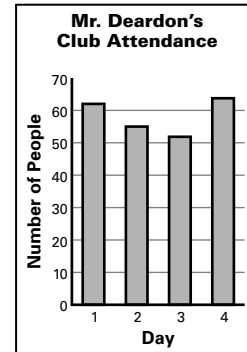
SPI 0706.5.1 (continued)

- 6** The line graph shows a trend in local air humidity. What is the greatest humidity?



- F** 40%
G 60%
H 50%
J 70%

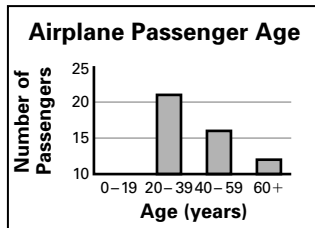
- 7** Use the graph to estimate average daily attendance.



- A** about 60
B about 50
C about 55
D about 70

SPI 0706.5.1 (continued)

- 8** Steven glanced at the graph below.



He concluded that there were no passengers under the age of 20 on the plane. Why might he be incorrect?

- F** The bars of the graph fall between the numbers shown in the vertical scale.
- G** The graph divides the passengers into too few age groups.
- H** The vertical scale starts at 10.
- J** The vertical scale ends too low.

- 9** Allison kept track of the Spanish club's income and expenses during the school year in the table below.

Transactions	
\$125	Bake sale income
-\$37	Spanish DVD rentals
-\$52	Subscription to Spanish newspaper
\$81	Craft sale income
-\$95	Trip expenses to Mexican consulate

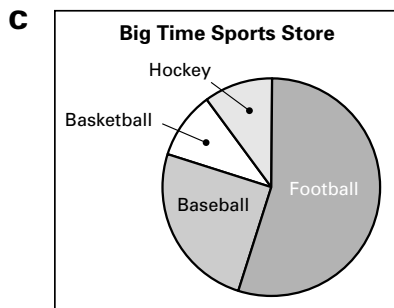
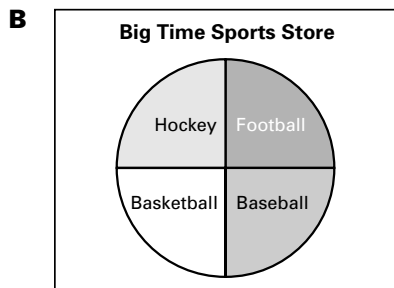
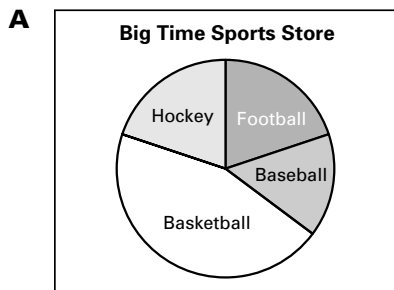
How much money did the club have at the end of the school year?

- A** \$390
- B** \$228
- C** \$22
- D** -\$140

SPI 0706.5.2

Select suitable graph types (such as bar graphs, histograms, line graphs, circle graphs, box-and-whisker plots, and stem-and-leaf plots) and use them to create accurate representations of given data.

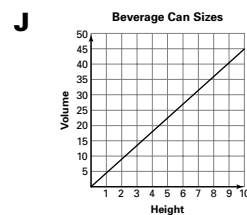
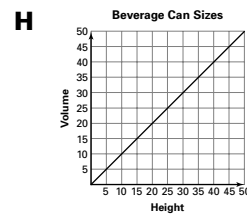
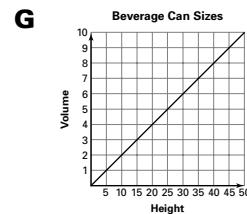
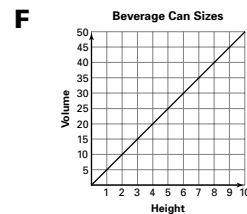
- 1** At Big Time Sports Store, 20% of the equipment sold is for football, 15% is for baseball, 45% is for basketball, and 20% is for hockey. Which graph best represents these data?



- 2** The data in the table below show the relationship between the height of a beverage can in inches, x , and its approximate volume in cubic inches, y .

Height in Inches, x	Volume in Cubic Inches, y
2	10
3	15
5	25
6	30

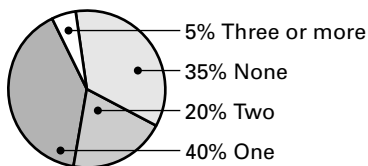
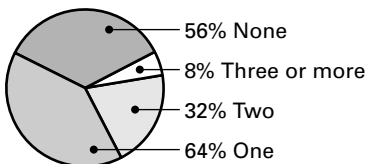
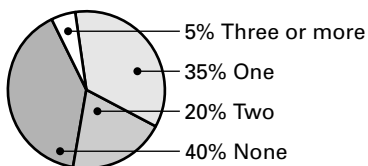
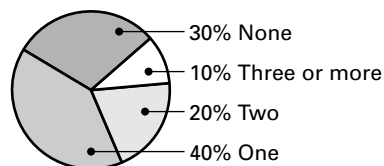
Which graph best represents the data in the table above?



SPI 0706.5.2 (continued)

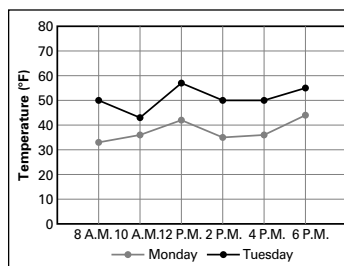
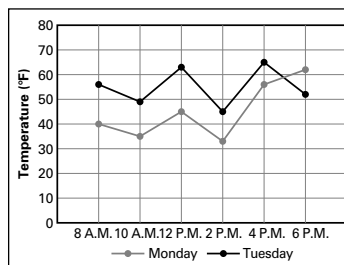
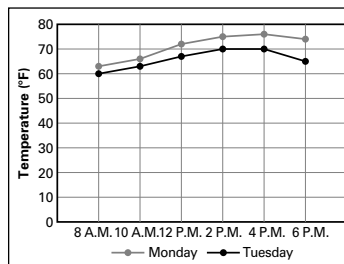
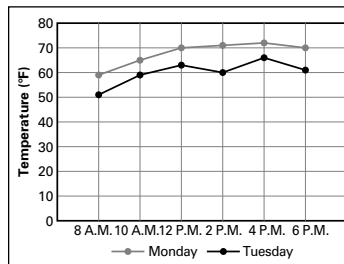
- 3** The table shows the results of a survey that asked students how many clubs they joined. Which circle graph best represents the data?

Number of Clubs	Number of Students
None	56
One	64
Two	32
Three or more	8

A Club Activity**B** Club Activity**C** Club Activity**D** Club Activity

- 4** The table shows the temperature outside your school during Monday and Tuesday. Which double line graph shows the temperature change over time?

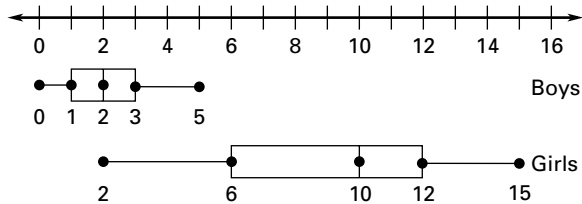
Time	8:00 A.M.	10:00 A.M.	12:00 P.M.	2:00 P.M.	4:00 P.M.	6:00 P.M.
Monday	63°F	66°F	72°F	75°F	76°F	74°F
Tuesday	60°F	63°F	67°F	70°F	70°F	65°F

F**G****H****J**

SPI 0706.5.3

Calculate and interpret the mean, median, upper-quartile, lower-quartile, and interquartile range of a set of data.

- 1** The box-and-whisker plot below shows the hair lengths in inches for boys and girls in a math class.



How much greater is the upper quartile of the hair lengths for the girls than the upper quartile of the hair lengths for the boys?

- A** 1 in.
B 2 in.
C 7 in.
D 9 in.
- 2** Which of the following data sets has a lower quartile of 8, a median of 23, and an upper quartile of 53?
- F** 6, 8, 23, 41, 53, 64
G 6, 6, 8, 41, 42, 64
H 6, 6, 46, 50, 53, 64
J 6, 8, 10, 36, 53, 64

- 3** If a set of data has 16 values, how many values will be between the lower quartile and the upper quartile?

- A** 4
B 8
C 16
D 32

SPI 0706.5.3 (continued)

- 4** Which gives the correct measures for the data below?

10, 14, 26, 38, 25, 40, 32, 2

F lower quartile: 12
median: 25.5
upper quartile: 35

G lower quartile: 10
median: 25.5
upper quartile: 32

H lower quartile: 2
median: 25.5
upper quartile: 40

J lower quartile: 20
median: 31.5
upper quartile: 35

- 5** What is the lower quartile of the data set below?

2, 2, 3, 5, 7, 9, 10, 12

A 2

B 2.5

C 5

D 6

- 6** The table shows the number of points scored by the high school football team in its first five games.

Game	Points Scored
1	41
2	32
3	22
4	19
5	21

Which is the mean of the number of points scored by the football team in its first five games?

F 18

G 22

H 27

J 33.75

SPI 0706.5.3 (continued)

Use this set of data to answer questions 7 to 10.

3, 6, 5, 4, 8, 5, 18

7 What is the mean of the set of data?

- A** 3
- B** 4
- C** 7
- D** 6

8 What is the median of the set of data?

- F** 1
- G** 4
- H** 5
- J** 6

9 What is the mode of the set of data?

- A** 3
- B** 5
- C** 4
- D** 8

10 What is the range of the data?

- F** 8
- G** 10
- H** 12
- J** 15

SPI 0706.5.3 (continued)

- 11** For this set of numbers, which is true?
5, 7, 7, 9, 13, 13, 13, 25, 28, 29, 34
- A** The mode is 7.
B The median is greater than the mean.
C Both the mode and the median have the same value.
D The median is 25.

- 12** The table shows how many tickets were sold for the six performances of a visiting dance company. If you have a list of ticket prices for each section of the 1300-seat auditorium, which two measures for the ticket sales would be most helpful in estimating the income from ticket sales?

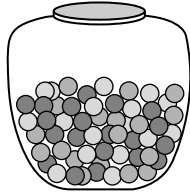
Day	Tickets
1	1,200
2	1,095
3	998
4	1,120
5	1,186
6	1,244

- F** mean and range
G median and mode
H median and range
J mean and median

SPI 0706.5.4

Use theoretical probability to make predictions.

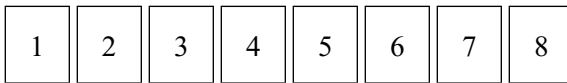
- 1** There are 100 marbles in a jar and only 4 of them are red.



What is the probability of drawing a red marble?

- A** 1.04
B 0.96
C 0.4
D 0.04

- 2** A card is randomly selected from the cards shown below.



What is the probability that the selected card will be a 4 or an odd number?

- F** $\frac{1}{4}$
G $\frac{3}{8}$
H $\frac{1}{2}$
J $\frac{5}{8}$

- 3** There are 20 marbles in a bag. Of the marbles, half are white and 2 are blue. The remaining marbles are red. If a marble is to be selected at random, what is the probability that the selected marble will be blue or white?

- A** $\frac{8}{20}$
B $\frac{10}{20}$
C $\frac{12}{20}$
D $\frac{18}{20}$

SPI 0706.5.4 (continued)

- 4** The probability of choosing a green marble from a jar is $\frac{7}{20}$. What is the probability of not choosing a green marble from the jar?

F $\frac{12}{20}$

G $\frac{13}{20}$

H $\frac{7}{10}$

J $\frac{14}{20}$

- 5** A box contains 30 slips of paper. The slips are the same size and shape but have different colors. There are one dozen white slips and one dozen purple slips. The remaining slips of paper are blue. What is the probability that a slip of paper chosen at random is purple or blue?

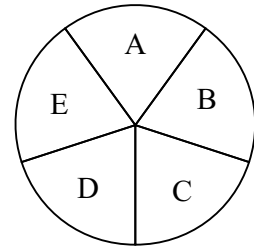
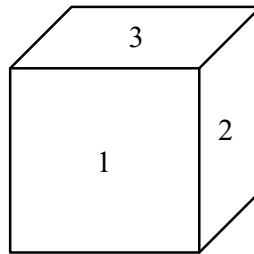
A $\frac{1}{5}$

B $\frac{2}{5}$

C $\frac{3}{5}$

D $\frac{4}{5}$

- 6** The number cube has faces labeled 1 through 6. The spinner has 5 equal sections labeled A through E.



What is the probability that the number cube will land on an even number and the spinner will land on a vowel?

F $\frac{2}{30}$

G $\frac{3}{30}$

H $\frac{4}{30}$

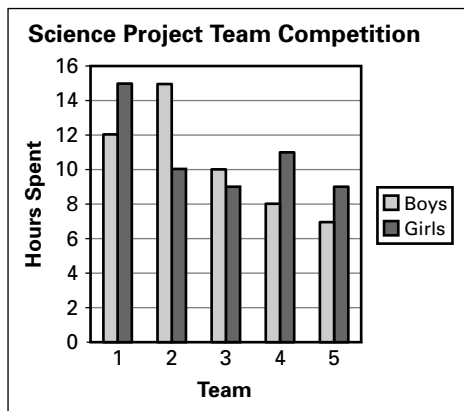
J $\frac{6}{30}$

Post Test

- 1** Filipe is driving from Dallas, TX, to Memphis, TN. The scale on his map is 1 inch : 150 miles. The distance between the two cities on the map is 3.25 inches. Which is the best estimate of the actual distance?

A 300 mi
B 400 mi
C 500 mi
D 600 mi

- 2** The bar graph shows hours spent on a science project by 5 teams of boys and 5 teams of girls.



About how many hours were spent by all the teams together?

F 15 h
G 52 h
H 54 h
J 106 h

- 3** Which inequality is true?

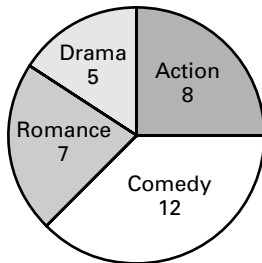
A $\sqrt{26} \geq 6$
B $\frac{5}{8} \geq 0.875$
C $\frac{\sqrt{36}}{6} \geq 1$
D $0.21 \geq \frac{1}{4}$

- 4** A pair of basketball shoes is on sale for 80% of \$60.00, the original price. Which equation can be used to find x , the original price?

F $\frac{x}{0.80} = 60$
G $0.80 \cdot x = 60$
H $60 \cdot x = 0.80$
J $\frac{0.80}{x} = 60$

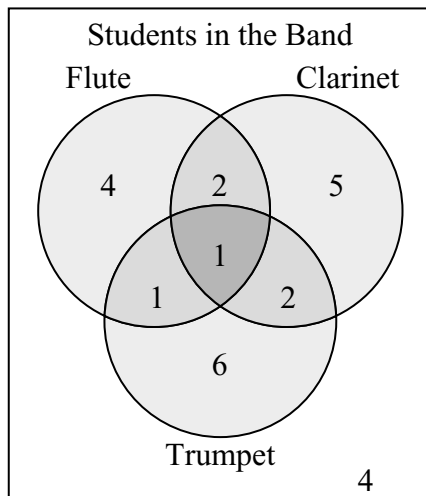
Post Test (continued)

- 5** The circle graph shows favorite movie types among students in Peter's class.



What percent of students chose comedy?

- A** 12% **C** 50%
B 37.5% **D** 75%
- 6** There are 25 students in the band. The Venn diagram shows the instruments some of the students play.



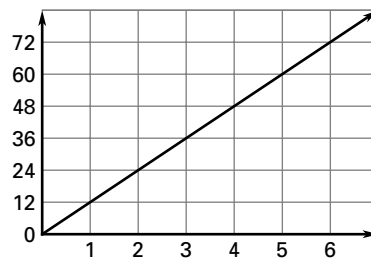
What is the probability that a student plays the flute or the clarinet?

- F** $\frac{3}{25}$
G $\frac{9}{25}$
H $\frac{3}{5}$
J $\frac{5}{7}$

- 7** A model airplane is built to scale, and is 10 inches long and 9 inches wide. If the real airplane is 40 feet long, how wide is it?

- A** 22.5 ft
B 31 ft
C 36 ft
D 39 ft

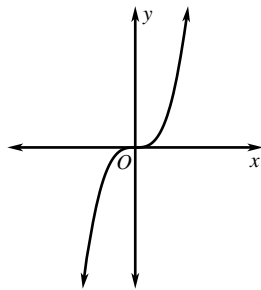
- 8** Which ratio is represented by the graph?



- F** inches to feet
G minutes to hours
H days to weeks
J kilometers to miles

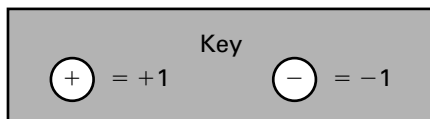
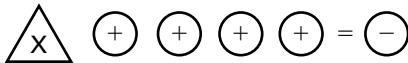
Post Test (continued)

- 9** Which is the equation of the graph below?



- A** $y = -x^2$
B $y = 3x^2$
C $y = x^3$
D $y = -x^3$

- 10** The model represents the equation $x + 4 = -1$.



What is the value of x ?

- F** $x = -5$
G $x = -3$
H $x = 3$
J $x = 5$

- 11** All of the following values of m make this inequality true, except which one?

$$\frac{1}{4} < m \leq \frac{\sqrt{4}}{4}$$

- A** $\frac{4}{8}$
B $\frac{5}{8}$
C $\frac{6}{8}$
D $\frac{7}{8}$

- 12** The shortest living dog is a 5.4-inch tall Chihuahua. The tallest living dog is a 42.2-inch tall Great Dane. What is the range of dog heights?

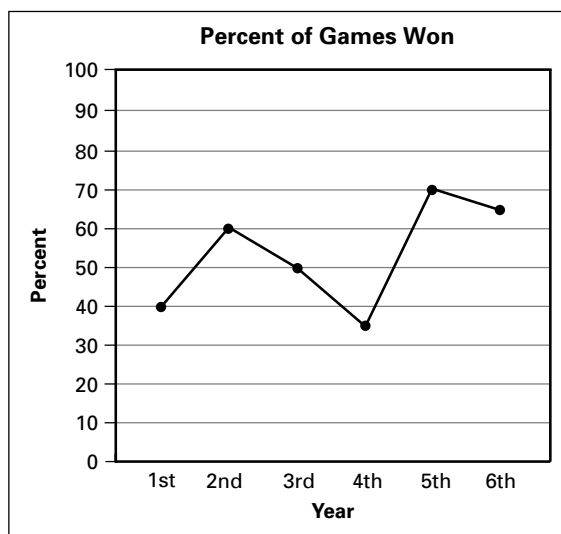
- F** 23.8 in.
G 36.8 in.
H 38.6 in.
J 46.8 in.

Post Test (continued)

- 13**
- If
- $x = 1.6$
- and
- $y = 4$
- , then find
- $3.6y \div x$
- .

A 0.9
B 1.44
C 9
D 14.4

- 14**
- The graph shows the percent of hockey games a school won during a 6-year period.



In which fraction of the years did the team enjoy a winning record?

F $\frac{1}{3}$
G $\frac{1}{2}$
H $\frac{2}{3}$
J $\frac{5}{6}$

- 15**
- The table below shows values for
- x
- and corresponding values for
- y
- .

x	2	3	4	5
y	7	13	19	25

Which equation represents the relationship between x and y ? Use the equation to find the value of $x = 10$.

A $y = 5x; 50$
B $y = 6x - 5; 55$
C $y = 3x + 1; 31$
D $y = 4x + 3; 43$

- 16**
- Leeann is going on a trip. She packs a blue shirt, a white shirt, and a green shirt. She also packs one blue pair of pants and one tan pair of pants. She drew this tree diagram to show the possible outfits she can wear.

shirt	pants	outcomes
blue	blue	blue, blue
	tan	blue, tan
white	blue	white, blue
	tan	white, tan
green	blue	green, blue
	tan	green, tan

What is the probability that she will wear something blue?

F $\frac{1}{6}$
G $\frac{1}{2}$
H $\frac{2}{3}$
J $\frac{4}{3}$

Post Test (continued)

- 17** The area of Joy's square vegetable garden is 64 square feet. What is the perimeter of Joy's garden?

A 8 ft
B 12 ft
C 32 ft
D 128 ft

- 18** Which equation models the function in the table if c represents the cost and n represents the number of pizzas?

n	1	2	3	4
c	7	12	17	22

F $c = 7n$
G $c = 6n + 1$
H $c = 10n - 3$
J $c = 5n + 2$

- 19** Five pounds of peanuts cost \$7.00. At this rate, how much does 3 pounds cost?

A \$2.00
B \$2.14
C \$4.20
D \$11.67

- 20** Which of the following is the solution to this inequality?

$$5x \geq -35$$

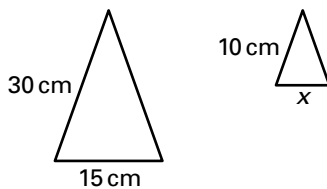
F $x \geq -7$
G $x \geq 7$
H $x \leq -7$
J $x \leq 7$

Post Test (continued)

- 21** If n is a multiple of 3, which is also a multiple of 3?

A $n + 5$
B $n + 13$
C $n + 15$
D $n + 20$

- 22** The two similar triangles shown are patterns used to create a new company logo.



What is the value of x , the base of the larger triangle, in centimeters?

F 2 cm
G 18 cm
H 27 cm
J 162 cm

- 23** If a factory can produce 211 bicycles in 1 month, about how many can it produce in 1 year?

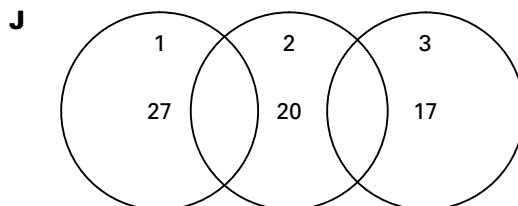
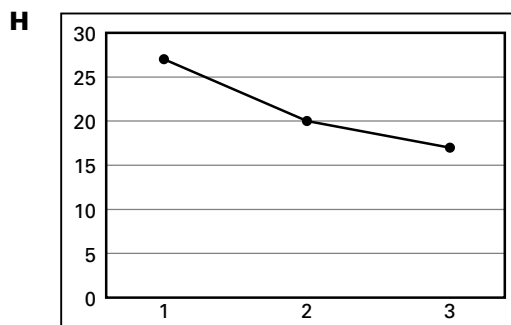
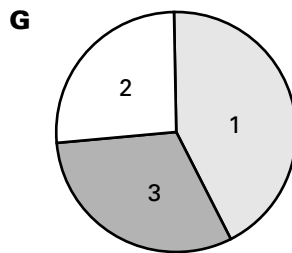
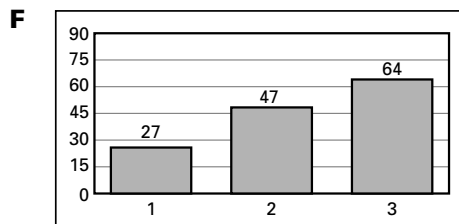
A 240
B 2,400
C 1,400
D 6,000

Post Test (continued)

- 24** An environmental protection group tracked the population of bald eagles in a national park over three years. Their results appear in the table below.

Year	Eagles
1	27
2	20
3	17

Which graph best represents these data?



- 25** The temperature in Springfield was -3°F at 6:00 A.M. During the next 3 hours, the temperature rose by 5 degrees Fahrenheit. What was the temperature in Springfield at 9:00 A.M.?

A -8°F
B -1°F
C 0°F
D 2°F

- 26** Two rectangular solids are similar. The volume of the smaller solid is 75 cubic inches. The volume of the larger solid is 9,375 cubic inches. What is the ratio of the side length of the smaller rectangular solid to the side length of the larger rectangular solid?

F $\frac{1}{125}$
G $\frac{1}{25}$
H $\frac{1}{5}$
J $\frac{1}{2}$

Post Test (continued)

- 27** This set of ordered pairs represents a function.
 $\{(2, 5), (3, 8), (4, 11), (5, 14)\}$
Which ordered pair could be included in the set so that it still represents a function?
- A** (0, 0)
 - B** (1, 0)
 - C** (1, 2)
 - D** (2, 1)

- 28** A triangle has lengths of 24 inches, 48 inches and 64 inches. Which list shows the side lengths of a similar triangle?
- F** 6 in., 12 in., 16 in.
 - G** 6 in., 18 in., 32 in.
 - H** 12 in., 18 in., 32 in.
 - J** 48 in., 96 in., 78 in.

Post Test (continued)

29 $\left(\frac{2}{3} \div \frac{3}{4}\right)^2 =$

- A** $\frac{1}{4}$
B $\frac{9}{16}$
C $\frac{64}{81}$
D $\frac{81}{64}$

- 30** Dr. Garcia measured four patients.

Patient	Height	Weight
Jorge	60 inches	178 pounds
Ron	62 inches	186 pounds
Carter	65 inches	194 pounds
Desi	64 inches	193 pounds

Which patient has the greatest ratio of weight to height?

- F** Jorge
G Ron
H Carter
J Desi

- 31** Based on the following data, about how long will it take to wash 14 cars?

Cars	6	11	16	21
Minutes	26	47	69	90

- A** 28 min
B 48 min
C 53 min
D 60 min

- 32** Carlos is 5 years younger than twice Stephanie's age s . If Carlos is 13 years old, then the equation $2s - 5 = 13$ represents this situation. How old is Stephanie?

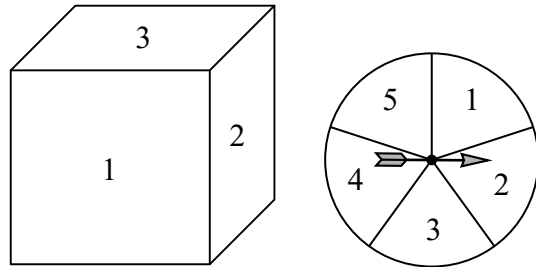
- F** 4 yrs
G 9 yrs
H 16 yrs
J 36 yrs

Post Test (continued)

- 33** Walking 10 blocks will consume approximately 75 calories. Approximately how many calories will be consumed if 25 blocks are walked?

A 160
B 185
C 200
D 210

- 34** The number cube has faces labeled 1 through 6. The spinner has 5 equal sections labeled 1 through 5.



What is the probability that the number cube will land on an even number and the spinner will land on 5?

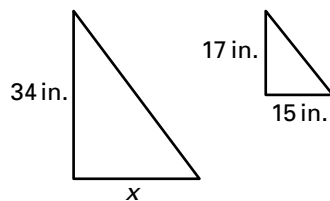
F $\frac{1}{10}$
G $\frac{1}{15}$
H $\frac{7}{10}$
J $\frac{4}{11}$

Post Test (continued)

- 35** A cube has a volume of 75 cubic inches. What is the side length of the cube to the nearest tenth?

A 4.2 in.
B 5.0 in.
C 8.7 in.
D 25.0 in.

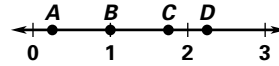
- 36** The two similar triangles shown are patterns used to make a kite.



What is the value of x , the width of the larger triangle, in inches?

F 7.5 in.
G 30 in.
H 32 in.
J 38.5 in.

- 37** Which point on the number line represents $\sqrt{5}$?



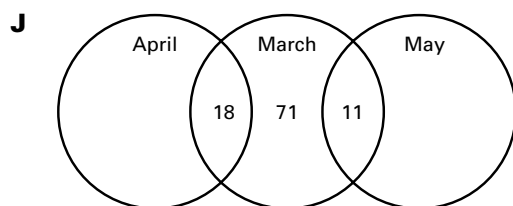
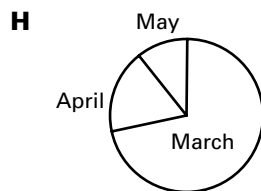
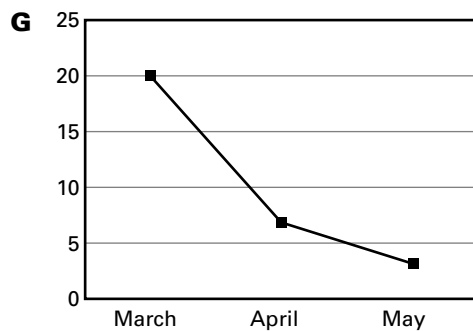
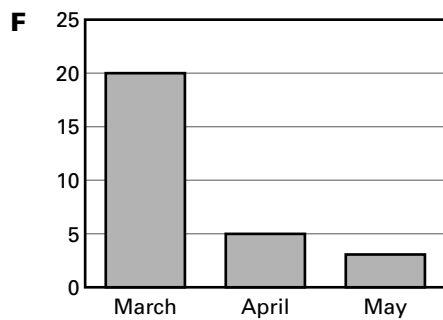
A A
B B
C C
D D

Post Test (continued)

- 38** Ms. Chiu, the librarian, ordered 28 new fiction books for Spring. The following data summarize the books' arrivals.

Month Received	Percent of Books
March	71%
April	18%
May	11%

Which graph best represents these data?



- 39** Tom's car travels about 450 miles on 18 gallons. About how far will his car travel on 7 gallons?

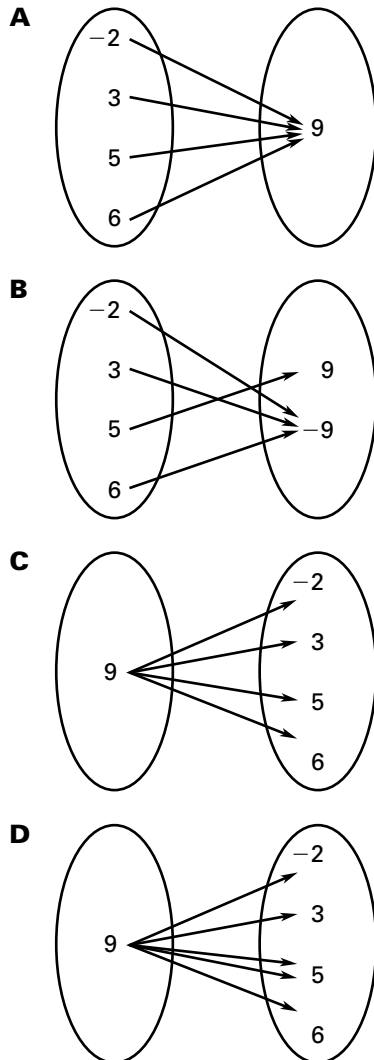
A 157 mi
B 175 mi
C 212 mi
D 236 mi

- 40** A triangle has lengths of 18 centimeters and 30 centimeters with an included angle of 46° . Which list shows the side lengths of a similar triangle?

F 9 cm, 15 cm, 44°
G 9 cm, 15 cm, 46°
H 36 cm, 45 cm, 44°
J 35 cm, 60 cm, 46°

Post Test (continued)

- 41** Which mapping represents a relation that is a function?



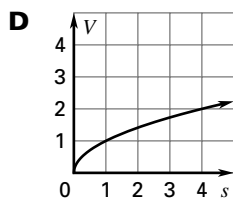
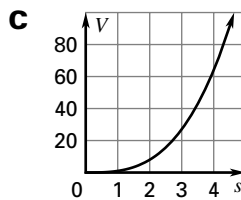
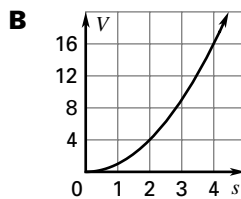
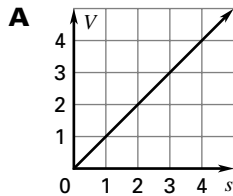
- 42** Which of the following is the solution to the following inequality?

$$\frac{1}{2}m > 12$$

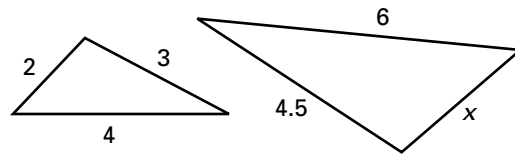
- F** $m < 6$
G $m > 6$
H $m < 24$
J $m > 24$

Post Test (continued)

- 43** The height of a square prism is 1 meter. Which graph best represents the relationship between the side length s of the base and its volume V as its dimensions are increased?



- 44** The two figures shown below are similar.



What is the measure of the missing side?

- F** 9
G 4
H 3
J 2

Post Test (continued)

- 45**
- Which rule generates the sequence

1.2, 1.4, 1.6, 1.8, 2, ...

where n represents the position of a term in the sequence?

- A** $2n + 6$
B $0.2n + 1$
C $0.4n + 0.8$
D $0.8n + 0.4$

- 46**
- Two squares are similar. The area of the smaller square is 8 square inches. The area of the larger square is 128 square inches. What is the ratio of the side length of the smaller square to the side length of the larger square?

- F** $\frac{1}{16}$
G $\frac{1}{8}$
H $\frac{1}{4}$
J $\frac{1}{2}$

- 47**
- Allison kept track of the Spanish club's income and expenses during the school year in the table below.

Transactions	
\$125	Bake sale income
−\$37	Spanish DVD rentals
−\$52	Subscription to Spanish newspaper
\$81	Craft sale income
−\$95	Trip expenses to Mexican consulate

How much money did the club have at the end of the school year?

- A** \$390
B \$228
C \$22
D −\$140

- 48**
- Julia listed the number of seventh grade students in each homeroom.

33, 27, 29, 31

What is the mean number of students in a seventh grade homeroom?

- F** 26
G 29
H 30
J 120

Post Test (continued)

- 49** Which statement best describes the relationship between x and y shown in the chart below?

x	0	1	2	3
y	10	8	6	4

- A** The value of y decreases as the value of x decreases.
- B** The value of y increases as the value of x increases.
- C** The value of y decreases as the value of x increases.
- D** The value of y remains constant as the value of x increases.

- 50** The table shows the mean temperatures for each of five days during one week last winter.

Mean Temperatures	
Day	Temperature (°F)
Monday	-4
Tuesday	2
Wednesday	4
Thursday	0
Friday	-5

Which lists the weekdays in order from the day with the lowest mean temperature to the day with the highest mean temperature?

- F** Friday, Monday, Thursday, Tuesday, Wednesday
- G** Friday, Monday, Tuesday, Wednesday, Thursday
- H** Thursday, Tuesday, Wednesday, Monday, Friday
- J** Thursday, Friday, Monday, Tuesday, Wednesday

- 51** Which statement is true?

- A** $0 < \sqrt{5} < 1$
- B** $2 < \sqrt{2} < 3$
- C** $3 < \sqrt{20} < 4$
- D** $4 < \sqrt{23} < 5$

- 52** The gas tank of Macey's car currently has 6.79 gallons of gas. If she adds 7.21 gallons of gas, the tank will be full. Which of the following equations can be used to determine x , the maximum amount of gas the tank can hold?

- F** $x + 6.79 = 7.21$
- G** $x + 7.21 = 6.79$
- H** $x - 6.79 = 7.21$
- J** $6.79 + x = 14$

Post Test (continued)

53 $\frac{21}{4} \div \frac{7}{3} \times 0.4 =$

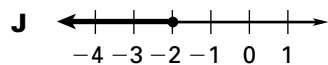
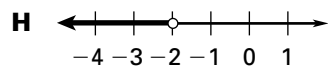
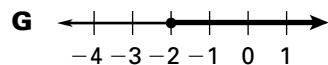
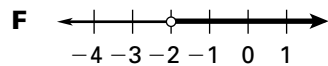
A $\frac{16}{90}$

B $\frac{9}{10}$

C $\frac{9}{4}$

D $\frac{147}{30}$

- 54**
- Which of the following graphs represents the solution to the inequality
- $-4x < 8$
- ?



- 55**
- If
- $k = \frac{1}{2}$
- and
- $m = 3$
- , then evaluate
- $k(m + 7)$
- .

A 5

B 8.5

C 10

D 20

Post Test (continued)

- 56** The formula for converting from Fahrenheit (F) degrees to Celsius (C) degrees is $C = \frac{5}{9}(F - 32)$. Find F if $C = 20$.

F 340

G 68

H $29\frac{3}{5}$

J $-6\frac{2}{3}$

- 57** During a 45-minute soccer game, Charlie's team had the ball for 35 minutes. About what percent of the game did Charlie's team have the ball?

A 20%

B 35%

C 70%

D 80%

- 58** This week a gas station is charging \$2.34 per gallon of gasoline. Emily made a graph to show the relationship between the number of gallons purchased and the total cost. What does the slope of the line represent?

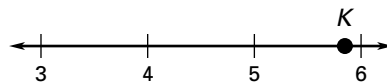
F the total cost

G the cost per gallon

H the number of gallons sold

J the number of gallons purchased

- 59** Point K represents the approximate location of which number?



A $\sqrt[3]{125}$

B $\sqrt[3]{200}$

C $\sqrt[3]{216}$

D $\sqrt[3]{250}$

Post Test (continued)

- 60** Sarah bought some ribbon for a sewing project. The table shows the relationship between the amount of ribbon purchased (r) and the cost (c).

Ribbon (r) (in feet)	Cost (c) (in dollars)
1	3
2	6
3	9
4	12

Which equation represents the relationship shown in the table?

- F** $c = 3r$
G $c - 8 = r$
H $r = 3c$
J $r + 2 = c$

- 61** A student got 68 questions correct on a test with 75 questions. About what percent of the test did the student get correct?

- A** 9%
B 68%
C 75%
D 91%

- 62** Mr. Wilson needs to paint the lines for the new soccer field. The longer sides will be $16\frac{2}{3}$ yards long, and the shorter sides will be 10 yards long. Which equation can be used to find p , the perimeter of the field?

- F** $p = 16\frac{2}{3} + 10$
G $p + 10 = 16\frac{2}{3}$
H $2p = 2\left(16\frac{2}{3}\right) + 2(10)$
J $p = 2\left(10 + 16\frac{2}{3}\right)$

Post Test (continued)

63 Evaluate $\left(0.8 + \frac{17}{20}\right) \div 2$.

A $\frac{89}{200}$

B $\frac{33}{40}$

C $\frac{33}{10}$

D $\frac{33}{2}$

64 What value of x make the equation below true?

$$\frac{2}{3}x + 8 = 6$$

F -3

G $-\frac{4}{3}$

H $\frac{4}{3}$

J 3

Pre Test**Fill in the correct answer.**

1. (A) (B) (C) (D)
2. (F) (G) (H) (J)
3. (A) (B) (C) (D)
4. (F) (G) (H) (J)
5. (A) (B) (C) (D)
6. (F) (G) (H) (J)
7. (A) (B) (C) (D)
8. (F) (G) (H) (J)
9. (A) (B) (C) (D)
10. (F) (G) (H) (J)
11. (A) (B) (C) (D)
12. (F) (G) (H) (J)
13. (A) (B) (C) (D)
14. (F) (G) (H) (J)
15. (A) (B) (C) (D)
16. (F) (G) (H) (J)
17. (A) (B) (C) (D)
18. (F) (G) (H) (J)
19. (A) (B) (C) (D)
20. (F) (G) (H) (J)
21. (A) (B) (C) (D)
22. (F) (G) (H) (J)
23. (A) (B) (C) (D)
24. (F) (G) (H) (J)
25. (A) (B) (C) (D)

26. (F) (G) (H) (J)
27. (A) (B) (C) (D)
28. (F) (G) (H) (J)
29. (A) (B) (C) (D)
30. (F) (G) (H) (J)
31. (A) (B) (C) (D)
32. (F) (G) (H) (J)
33. (A) (B) (C) (D)
34. (F) (G) (H) (J)
35. (A) (B) (C) (D)
36. (F) (G) (H) (J)
37. (A) (B) (C) (D)
38. (F) (G) (H) (J)
39. (A) (B) (C) (D)
40. (F) (G) (H) (J)
41. (A) (B) (C) (D)
42. (F) (G) (H) (J)
43. (A) (B) (C) (D)
44. (F) (G) (H) (J)
45. (A) (B) (C) (D)
46. (F) (G) (H) (J)
47. (A) (B) (C) (D)
48. (F) (G) (H) (J)
49. (A) (B) (C) (D)
50. (F) (G) (H) (J)

51. (A) (B) (C) (D)
52. (F) (G) (H) (J)
53. (A) (B) (C) (D)
54. (F) (G) (H) (J)
55. (A) (B) (C) (D)
56. (F) (G) (H) (J)
57. (A) (B) (C) (D)
58. (F) (G) (H) (J)
59. (A) (B) (C) (D)
60. (F) (G) (H) (J)
61. (A) (B) (C) (D)
62. (F) (G) (H) (J)
63. (A) (B) (C) (D)
64. (F) (G) (H) (J)

Post Test**Fill in the correct answer.**

1. (A) (B) (C) (D)
2. (F) (G) (H) (J)
3. (A) (B) (C) (D)
4. (F) (G) (H) (J)
5. (A) (B) (C) (D)
6. (F) (G) (H) (J)
7. (A) (B) (C) (D)
8. (F) (G) (H) (J)
9. (A) (B) (C) (D)
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15. (A) (B) (C) (D)
16. (F) (G) (H) (J)
17. (A) (B) (C) (D)
18. (F) (G) (H) (J)
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20. (F) (G) (H) (J)
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22. (F) (G) (H) (J)
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24. (F) (G) (H) (J)
25. (A) (B) (C) (D)

26. (F) (G) (H) (J)
27. (A) (B) (C) (D)
28. (F) (G) (H) (J)
29. (A) (B) (C) (D)
30. (F) (G) (H) (J)
31. (A) (B) (C) (D)
32. (F) (G) (H) (J)
33. (A) (B) (C) (D)
34. (F) (G) (H) (J)
35. (A) (B) (C) (D)
36. (F) (G) (H) (J)
37. (A) (B) (C) (D)
38. (F) (G) (H) (J)
39. (A) (B) (C) (D)
40. (F) (G) (H) (J)
41. (A) (B) (C) (D)
42. (F) (G) (H) (J)
43. (A) (B) (C) (D)
44. (F) (G) (H) (J)
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46. (F) (G) (H) (J)
47. (A) (B) (C) (D)
48. (F) (G) (H) (J)
49. (A) (B) (C) (D)
50. (F) (G) (H) (J)

51. (A) (B) (C) (D)
52. (F) (G) (H) (J)
53. (A) (B) (C) (D)
54. (F) (G) (H) (J)
55. (A) (B) (C) (D)
56. (F) (G) (H) (J)
57. (A) (B) (C) (D)
58. (F) (G) (H) (J)
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